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PRINCIPLES OF ACCOUNTING

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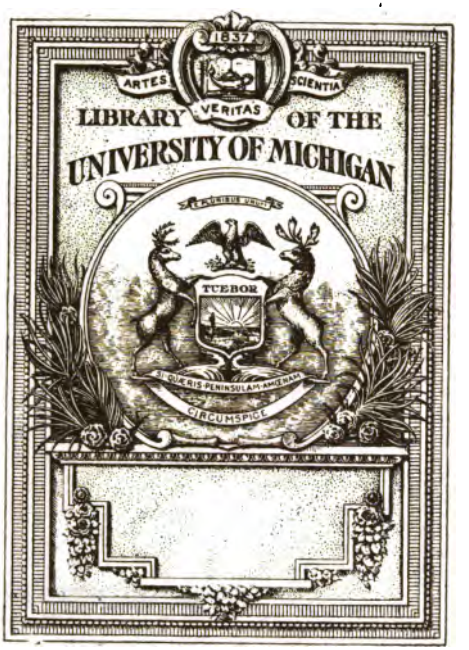

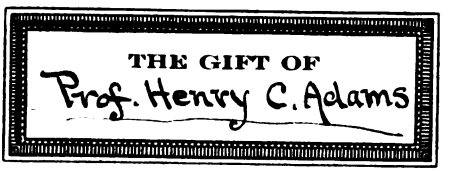

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PRINCIPLES OF ACCOUNTING

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PRINCIPLES OF ACCOUNTING

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PREFACE

This book is intended primarily as a college text for general courses in accounting. Certain chapters may be found available for collateral reading in work covering special fields of the subject. The organization of the material and the method of presentation here employed are the product of several years' experience in the class room. Throughout the book other considerations have been subordinated to pedagogical ends.

The terminology used does not conform to business usage at all points. An attempt has been made to standardize the nomenclature for all important conceptions. As far as possible the terms adopted by the Interstate Commerce Commission in its standard classifications (which represent the most logical system of accounting phraseology at present) have been employed.

An effort has been made to develop the fundamental principles of the subject with little reference to the details of specific systems of bookkeeping. The assumption underlying this procedure recognizes in accounting a science of logical classification embracing a definite body of doctrine which can be developed independently of clerical technique. Furthermore, the rapidity of change in bookkeeping practice and the fact that special systems can only be understood in connection with the nature of particular industrial enterprises renders a discussion of such details of minor importance in a treatise on principles. Once a student is thoroughly grounded in principles, a mastery of the necessary technical details of any particular system is easily attained.

The authors wish to make special acknowledgement of their indebtedness to Professor David Friday of the University of Michigan, whose helpful suggestions and criticisms have done much to make this book possible. Professor Friday's "Problems in Accounting" have been arranged in chapters to accompany this edition.

A revision of this volume will be published early next year. Extensive appendices will be added which will include the following topics: Interest tables; illustrations of improved bookkeeping forms; and a selected bibiography.

W. A. PATON
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September 1, 1916.

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PRINCIPLES OF ACCOUNTING

I

INTRODUCTION

In a broad sense, accounting is the science which attempts to present and classify the information calculated to throw light upon the economic process. The nature and scope of accounting and the present emphasis upon this and other branches of statistical science can best be explained in relation to a number of characteristics of modern industrial society.

In the first place can be mentioned the large size of the modern business unit. A century ago the large organization was the exception; the normal type of business was the partnership or sole-proprietor enterprise. The amount of capital involved was small; goods were produced for a limited market area; often the proprietor knew all of his customers personally: in such cases extensive statistical records were unnecessary. The proprietor could readily keep in mind the details of the business process, and could ascertain the status of the enterprise at any time by inspection.

Today we are familiar with the billion-dollar enterprise, operating many distinct plants, and selling goods in a world market. The influences that have made possible this concentration are familiar. One of the most important factors has been the tremendous improvement in transportation facilities and the consequent extension of the market. The development of the corporate form of organization is another important factor which has contributed to this concentration—from the financial standpoint the most important. This form of business organization makes possible the bringing together of vast aggregates of capital. The Pennsylvania Railroad Company, for example, has the names of over 75,000 stockholders in its stock ledger. In the case of such large enterprises the need for extensive statistical records is imperative.

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Closely connected with the large size of the modern business unit is the great variety of property types used in production. The production of transportation service, for example, involves the use of many kinds of property; such as, land, bridges, tunnels, rails, ties, buildings, various kinds of services, etc. The classification, "Investment in Road and Equipment," prescribed by the Interstate Commerce Commission for the use of steam railways, provides for seventy-seven primary accounts, and some companies use many subsidiary property accounts. Similarly in manufacturinig and other industries (in fact wherever large-scale production is developed) a complex equipment is necessary.

This complexity of property bears an important relation to the theory of financial statistics. The problem of ascertaining the amount of property expired in any given period is complicated by the great variety of property used. This problem is rendered still more difficult by the fluctuations in price to which the modern market is susceptible. In a static society the problem of ascertaining the status of property is largely physical. Where prices are dictated by custom, physical units need not be converted into value terms. The present heterogeneous character of property necessitates the use of value units in the rational utilization of this property equipment. Further, the continual fluctuations in the level of prices, which constitutes a change in the measuring unit itself, requires recognition in the statistical records. "Prices render possible the rational direction of economic activity by accounting, for accounting is based upon the principle of representing all the heterogenous commodities, services, and rights with which a business enterprise is concerned in terms of money price."[1] The point should be emphasized that accounting deals primarily with the value representations of things; the use of physical facts in accounting statistics is entirely subordinate.

Another characteristic of modern business which has contributed to the present emphasis upon accounting is the specialization of securities which has been made possible by the development of the corporate form of organization. Not only do many individuals contribute capital to this type of enterprise, but their rights to income and property vary acording to the class of security held. Today we are familiar with common stock, preferred stock, mortgage bonds, debenture bonds, income bonds, collateral trust notes, etc. (often all of the classes mentioned are found in one

[1] W. C. Mitchell, *Business Cycles*, pp. 31-32.

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enterprise); and some of these classes may be subdivided almost indefinitely. The task of preserving the rights between the different classes of security-holders is a difficult one, and cannot be satisfactorily accomplished without the aid of information based upon extensive statistical data.

A phenomenon of the modern industrial process is its susceptibility to trade disturbances. While the severity of the business cycle has been due in a measure to unsound banking and credit institutions, it should be recognized that reforms in this direction can never be more than palliatives. The immediate control of the industrial process is in the hands of the entrepreneur and his managers. Thus the financial process of making money dominates, in an important sense, the industrial process of producing goods and the commercial process of distributing goods. The essential cause of the business cycle is the difficulty experienced by the entrepreneur and the business world generally in accurately forecasting the market situation. It is coming to be recognized that extensive dissemination of complete and reliable information concerning the entire industrial process is the most promising remedy for alleviating this situation. This is evidenced by the commercial success of such enterprises as the Moody Manual Company, the publishers of Moody's Manual of Railroad and Corporation Securities, and similar publications. The data concerning the financial situation furnished by the accounts forms an important part of the information necessary for the construction of a trade barometer.

The present tendency toward public control and regulation of industry is another factor which emphasizes the need for accounting analysis. The public has awakened to the need for controlling the activities of the entrepreneur when the interests of the individual conflict with those of society. Further, the complexity of the private equities involved renders more emphatic the need for government interference. The public can pass sound judgments on the complex situations that arise only on the basis of reliable statistical information.

Much emphasis is being placed at present upon the necessity for internal economy of organization in industrial enterprises. There are several causes for this situation. First may be mentioned the fact that the opportunities to increase revenues through the exploitation of undeveloped natural resources is largely past. In addition to this, the technique of industry, which has undergone tremendous development in the past century and a half, is becoming standardized; this means that the opportunities for building large fortunes through

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the development of inventions are more restricted than formerly. As the country grows older, as population increases, as competition becomes keener, the need of efficiency in production is emphasized. The problem of improving the utilization of our economic resources is one of the most important of modern questions. The solution of this problem requires a very extensive statistical analysis of the productive process.

The above discussion suggests the more important factors contributing to the present emphasis upon general statistical analysis. The specific problems with which *accounting* deals can be grouped under two general heads: (1) the problems of the equities; and (2) the problems of management. We shall briefly examine each of these divisions.

From the standpoint of the equities involved the accounting records of a business enterprise should furnish two kinds of information: (1) a history of the operation of the enterprise during the fiscal period; (2) the financial status of the business at the end of the period. These are the fundamental facts which must be ascertained if the rights of the various individuals having equities in the property are to be preserved. If the entire property is owned outright by one person, inaccuracies in this information or an entire absence of such data cause no injustice between individuals. If the number of investors is large and if their equities vary considerably in character, however, the problem of ascertaining these facts is at once more difficult and more important. In the corporation, for example, the personnel of the investors is continually changing, due to the ease with which securities can be transferred from one individual to another. Thus if an error in stating net income is made in one period it is probable that the rights of some of the individuals whose equities have been misstated cannot be restored by the correction of the error in a later period. Further, there is the added difficulty of apportioning the annual income among the various classes of security-holders. This may be illustrated by the case of a certain company which has outstanding, among other equities, six per cent non-cumulative preferred stock. Through an error in accounting analysis in the annual income statement for one year, net income as shown was not sufficient to pay the regular six per cent dividend. The loss of this dividend by the perferred stockholders cannot be regained in later periods. In fact this loss will inure to the benefit of the common stockholders. Assuming that it is possible to expand the business and increase net earnings through the retention of profits in the enterprise, it would be to the advantage of the com-

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mon stockholders, who have the larger element of control, to adopt a policy which would lead to an understatement of net income. The accountant is called upon to pass judgment upon accounting procedure which affects net income, and hence the relations between the various equities.

Similarly the status of the equities represented in the enterprise must be determined at various moments of time. Not only must net income be apportioned between the different classes of investors, but the status of each equity must be shown after this division is made. Only from such information can the financial condition of the enterprise be ascertained. This data must be furnished to the present investor if he is to know the status of his investment. The prospective creditor or investor must also have this information if he is to proceed rationally in the use of his capital. Further, if the state is to do justice to all parties concerned in the adjudication of disputes, such statistics must be available.

Ordinarily only the individuals who furnish capital to an enterprise are considered as having equities in the property. Under certain conditions, however, the public interest approaches the nature of an equity. The state reserves the right of appropriating a portion of income by taxation. Insofar as the state assumes control of prices and methods of financing, the public has an interest which carries with it more control than the equity of the private investor. In certain cases the public exercises complete ownership, and here the public interest constitutes a distinct equity.

Even the rights of the laborer represent an equity in the property when this term is broadly interpreted. The wage earners's right to a portion of the earnings of an enterprise has a definite legal status. Especially in certain industries is the laborer coming to have an authoritative voice in the control of operation. The dispute between the railroad operatives and owners in the summer of 1916 reveals the strength of the laborer's position in the enterprise. Although the interests of the laborer and the public are not recognized in the accounting records as equities per se; still the accountant must recognize the influence of both of these interests upon accounting problems. It is possible that in time a more definite recognition will be given these equities in the accounts.

The second general division of accounting mentioned above comprises the problems of management. These are peculiarly statistical problems. The manager must have the information necessary to base rational judgments as to the effective utilization of the resources at his disposal. The importance of this question upon finan-

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cial success, and the tendency to emphasize this phase of statistics can be illustrated from the railroad industry. Twenty-five years ago the attention of the operating officials was centered upon the gross revenue figure, rather than upon costs. The conquest of new territory through the extension of main lines and the development of branch lines and feeders, characterized the railroad industry and made possible the constant and rapid growth in gross revenues. Economy of organization was entirely overlooked in the scramble for traffic. Today gross revenue has reached a more stable position. No longer is it possible to cover up gross inefficiency in management with revenue from constantly increasing traffic. In view of the rise in wages and other expenses the only possibility of preserving the margin of profit is through an increase in efficiency. This situation is reflected in the building of new road. In late years the increase in mileage has been insignificant, although a considerable extension of trackage has been made; that is, lines are not being extended, but already existing lines are being double-tracked and otherwise improved.

This situation is duplicated in all lines of industry. To prevent costs from encroaching upon the profit margin, managerial efficiency is necessary. The manager is called upon to pass judgments as to the most effective utilization of the economic factors available. What are the most effective combination of factors? What are the most efficient processes? What are the best methods of organizing and paying labor to secure efficiency in production? These and similar questions the managers must answer. It is the function of cost accounting, so-called, to furnish the statistical information necessary to aid the manager in making these judgments.

The emphasis of the succeeding chapters will be upon the first group of problems: viz., the problems of the equities. Because of the dominating influence of the proprietary interests the discussion will center around the problems of proprietorship.

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II

THE THEORY OF THE DOUBLE-ENTRY SYSTEM

If the accountant is to be an effective aid to industrial activity, a serviceable technique must be at his disposal; and the first step in the study of accounting is the mastery of the main principles of this technique. The data with which accounting deals must be handled in some orderly, efficient fashion if satisfactory results in directing business conduct are to be attained. Although many systems for recording the necessary facts are possible, the approved system in general use is known as the double-entry method of keeping accounts. It is the purpose of this chapter to explain the theory of this method; and to show that the double-entry system is founded logically in the facts of business, and serves as an admirable tool to register and order the facts with which accounting is concerned.[1]

The Fundamental Classification of Business Data

The important unit of organization with which accounting deals is the business firm. The "set of books" in which the book-keeper records the data are the books of a single concern. Let us take a hypothetical business, the A. B. Co., at its inception, and analyze the facts which its books must show, both at the outset and after operations have begun. In this analysis of facts the theory of double-entry will be developed.

The A. B. Co. organizes. What are the data necessary to a statement of the firm's financial status? Clearly one important category embraces all the property items to which the A. B. Co. has any title. If we are to know anything about the condition of this company, obviously we must have a complete statement of property. This property might consist not only in many different kinds of tangible goods, but also in valuable services, rights, franchises, patents, etc.,

[1] It will be impossible to avoid introducing into this chapter certain terms and concepts which will not be fully developed until later chapters; as in many other subjects the student's mastery of ideas early raised is not complete until the entire field has been covered.

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and claims against other parties. Materiality is no test as to what is or what is not property, either from the standpoint of the business firm or from the social standpoint; and this fact is recognized both in business practice and in economic theory. These various kinds of property may be listed or classified very minutely, or they may be stated under a few heads. As to how far the property items shall be subdivided is purely a matter of expediency, depending upon the character of the enterprise.

Suppose the property of the A. B. Co. consists in: Buildings, $130,000; Real Estate, $60,000; Furniture and Fixtures, $30,000; Merchandise, $80,000; Cash, $20,000. Then the financial statement of the firm must show this list of property; and the items may be stated in any convenient way. We will list them in a column, one below another; thus:

Property	
Buildings	$130,000
Real Estate	60,000
Furniture and Fixtures	30,000
Merchandise	80,000
Cash	20,000
Total	$320,000

Does this list of facts give us a satisfactory statement of the financial condition of the company? No, this is clearly inadequate; either from the standpoint of the interests of the A. B. Co., a probable purchaser of the business, or any other party concerned. It must be determined whether the A. B. Co.'s title to this property is clear. Are there any incumbrances or claims against this property? What is the distribution of ownership? Or more concisely: What are the *equities* in this property? The equities like the property items may have a variety of forms. The A. B. Co. may own all the assets clear, or the company may have only a small net interest in the property and the greater part of the ownership may be vested in outside parties whose claims may be represented by bonds, promissory notes, creditor's accounts, etc. Suppose that the claims against property in this case consist in: Bonds, $100,000; Notes Payable, $20,000; and the A. B. Co.'s equity, $200,000.[2] These facts may

[2] This last item is usually called *proprietorship;* and in the case of a corporation is represented by capital stock less the deficit if one exists, or capital stock plus real surplus if any such exists. The various accounts representing proprietorship will be fully discussed in a later chapter.

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be listed in a column as was done in the case of property items. These columns might be arranged in any convenient way; we shall tabulate them in the following form:

Property		Equities	
Buildings	$130,000	A. B. Co.	$200,000
Real Estate	60,000	Bonds	100,000
Furniture and Fixtures	30,000	Notes Payable	20,000
Merchandise	80,000		
Cash	20,000		
Total	$320,000	Total	$320,000

This *balance sheet* form of presenting a statement of a firm's financial condition is a lucid and concise way of showing the necessary facts, but it is not the only method. The essential thing is to have all the facts presented and set down in the most intelligible form; and from every point of view it appears desirable to separate in some way the two distinct categories: property and equities. One writer has observed that the balance sheet is the "ground-work of accountancy." [3] Certainly the balance sheet represents a classification of facts which is the basis of the double-entry system.

It is apparent that these two classes of facts, property and equities, will always be numerically equal, for they are merely different aspects of the same thing. We have but one class of objective things to deal with, viz.: the property items. In one case we are listing the actual property; in the other case we are looking at the same property, but are noting certain facts representing the legal relationships between this property and certain individuals or interests—that is, we are representing now the distribution of ownership, or the claims against the property, or, more exactly, the equities in property. And since we are using the same measuring unit, the dollar, in stating both classes of facts, we have numerically equal totals. It is customary to denominate one list of facts assets or resources and the other class liabilities, and no great harm need result from this nomenclature. However, it might be urged that the term liabilities has the connotation of debts or outside obligations, and this meaning clearly does not apply to the proprietor's equity.

[3] Sprague, *The Philosophy of Accounts.*

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If instead of assets and liabilities, property and equities were used, there would be less danger of misunderstanding and bad accounting practice. But there is little hope of changing usage that is so well established as are these terms; and indeed there is little necessity for the change, as the distinction just noted between outside obligations and proprietorship, while of great practical importance in certain connections, is not fundamental.

Under two heads, then, all the data necessary for an accurate statement of the firm's financial status at its inception may be listed; and the sum of the property items is always equal to the sum of the rights-in-property items, or equities[4]. Further, this inevitable equality is the foundation of double-entry book-keeping. Here is the origin of the equality between debit balances and credit balances.

It might be urged that we are here setting up an equality that is not grounded in any logical classification of facts, but is rather artifically maintained by including among the so-called equity items highly dissimilar things. For it might be insisted that proprietorship and outside equities or liabilities show no relationship; that proprietorship is what the firm is worth and other liabilities are what it owes; that proprietorship is elastic and outside claims are rigid. Now it must be admitted that there *are* differences between the various equities in property, and for some purposes distinctions must be drawn between them. (For that matter we are drawing distinctions when we give them different headings.) But that there is also a

[4] There are apparent—though only apparent—exceptions to this statement in accounting practice. A practice of book-keeping which we shall have occasion to deal with frequently is the substitution of addition for subtraction wherever possible. This is done by adding the amount to be subtracted in any case to the opposite side of the same or some account. This procedure secures neatness, and economy of effort; and there are in many cases special reasons for maintaining original book figures. For example, it is convenient to keep capital stock on the books at par. If a company is financed through the issue of securities sold at a discount this will mean that the nominal (par) value of the securities is greater than the value of the actual property received. Then if this par value is recorded as an equity, the extent to which that equity is overstated is indicated by including the amount of the discount among the property items. Wherever a business is dissipating its assets through losses and still maintains the proprietorship at the old book value you have a similar situation. These cases will all be fully discussed later in the text. It will be sufficient to say at this point that the substitution of addition on the opposite side instead of actual subtraction, or, as it is sometimes put, the use of "valuation" items, explains all apparent exceptions to the statement made above.

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fundamental *relationship* can not be denied. Capital stock, bonds, mortgages, notes payable, and even general creditors' accounts all represent rights in the property. Undoubtedly there is a sense in which the stockholder is the owner *par excellence,* for stock ownership carries with it the large element of direct control, and the large element of risk; but the bondholder has contingent control and can also properly be thought of as owner.[5] This fact is coming to be clearly recognized in railway properties where we find the specialization of securities very fully developed. In recent railway receiverships and reorganizations it is evident that the stockholders, the bondholders, and the general creditors are all thought of as owners. At least it is recognized that they all have rights in the property and that the differences between their various claims are differences in degree, and are not fundamental distinctions. Certainly any one would admit that the property items form a legitimate classification; and yet what sharp differences exist between Notes Receivable and Buildings, or between Patents and Machinery!

The financial statistics of a business enterprise can thus be listed in two fundamentally distinct, and numerically equal classes: *property* and *equities;* and, as was suggested above, the essence of the double-entry system of keeping accounts consists in the separation of the members of the equation: property=equities, and in the maintaining of the equality. With this equation as a basis a convenient and intelligible system of ordering and presenting the necessary facts is built up; and—as will appear later—a very important characteristic of this system is the test for arithmetical accuracy which it gives. The explanation as to how the double-entry system is built up from this basic classification will now be undertaken.

The Construction of the Accounts

The hypothetical A. B. Co. begins operations. It will be well at this point to consider briefly just what the operation of a business means to the accountant. An equipment of property—physical property such as land, buildings, tools, raw materials, etc., and services, such as ordinary labor, managerial capacity, etc.—is incorporated with the particular service of the proprietor and results in a flow of product—either commodities or services—which is sold to the consuming public. The continued production of this com-

[5] The distinction between the proprietor's equity and the liabilities will be more fully discussed in Chapter V.

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modity or service can be secured only at the expense of constant decay, replacement, and change among the property elements involved. In other words there will always be a continual shifting among the property elements as business operation proceeds. Similarly as respects the facts of ownership a process of shifting will be taking place; the amounts and character of the equities will be changing from time to time (the only exception would be the case of a business which paid no debts and contracted no new obligations during a given period, and whose operation resulted in neither profit nor loss.)

It is evident that the accounts of the business should be so constructed as to conveniently record these changes which occur on both sides of the fundamental equation. As one writer has suggested it would be possible to follow these changes simply by altering in the proper direction the property and equity items as they appear on a tabular financial statement such as was given above; and when new kinds of property are secured, or when new equities appear, these new headings could be listed in the same way. An obvious objection to this procedure is its inconvenience; the fundamental objection is that accounting statements so constructed would throw little light on the business process, and, as was brought out in the preceding chapter, the data of the historical as well as the synoptic situation are necessary to meet the needs of the different interests involved.

It will be necessary, then, to extend or stretch out the above financial statement of the A. B. Co. so that space will be available for the recording of the transactions which may effect the original amounts. This virtually means the opening of an account for each kind of property and for each equity, thus:

Buildings	A. B. Co.
$130,000	$200,000
Real Estate	**Bonds**
$ 60,000	$100,000
Furniture and Fixtures	**Notes Payable**
$ 30,000	$ 20,000
Merchandise	
$ 80,000	
Cash	
$ 20,000	

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Let us analyze the transactions which may occur—first as to the effect on property accounts. Clearly property items may be affected in two ways; a property balance may be either increased or decreased; there may be additions to property or there may be subtractions or withdrawals from property. A book-keeping rule already referred to is the substitution of addition for subtraction wherever possible to avoid the inconvenience of subtraction, and to preserve original figures. Accordingly it will be desirable to have two separate columns under each property heading; one for the additions or positive items, and one for the subtractions or negative items. Now how shall we arrange these columns; shall we preserve the positive items at the left and the subtractions at the right or vice versa? The answer to this question is not at all a matter of principle; either arrangement will serve as well as the other. In the tabular statement of properties and equities given above the property items were set at the left and the equity balances at the right. This is the arrangement followed in this country. The essential thing is a separation of the two fundamental classes of facts; the arrangement after the classification is made is a matter of little importance. But if we decide to have *left* stand for *property* balances and *right* for *equity* balances, then it will be necessary in the positive and negative columns under each property heading to use the left-hand column for additions, and the right-hand column for subtractions in order to preserve positive property balances at the left. This is the essential nature of any ledger account: two columns, one for additions and one for subtractions; and custom decrees that in property accounts, the left shall be used for additions, the right for subtractions.

Similarly transactions affecting the equity items may result in either increasing or decreasing an equity balance. Consequently each equity account has need of two columns, a positive column for additions and a negative column for subtractions. What shall be the arrangement of these columns? Again the answer is that the arrangement is an arbitrary matter, the only essential principle in constructing the ledger accounts being the preservation of the fundamental classification, *property* and *equities;* and since we have decided to keep positive property balances at the left and equity balances at the right, it will be necessary in the positive and negative columns under each equity heading to use the right-hand column for additions and the left-hand column for subtractions.

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The scheme of the construction of the ledger accounts in their relation to the fundamental classification can be represented; thus:

The A. B. Co.

Property		Equities	
Additions	Subtractions	Subtractions	Additions
Buildings		A. B. Co.	
$130,000			$200,000
Real Estate		Bonds	
$ 60,000			$100,000
Furniture and Fixtures		Notes Payable	
$ 30,000			$ 20,000
Merchandise			
$ 80,000			
Cash			
$ 20,000			

Thus far it appears that we arbitrarily list all property balances on the left-hand side, and all equity balances on the right-hand side; and the fact should be emphasized again that the only important consideration controlling the construction of ledger accounts is the maintaining of the classification represented by the equation: property equals equities.

Now have we here all the accounts necessary to record the trans-

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actions that may take place when the firm begins operations? It was stated above that it is useful for the accountant to conceive of the operation of the business as the combination of a more or less considerable variety of commodities and services with the service of the proprietor for the purpose of producing some other commodity or service for sale. Now it is obvious that, even in the case of a retail concern such as the A. B. Co., where the productive process is physically simple, there will necessarily be involved other kinds of commodities and services than those the company now has on hand. Labor power is necessary in practically all productive processes; and certainly the A. B. Co. will be obliged to purchase labor from time to time if operation is to proceed. The services of insurance and advertising will doubtless be secured; it will be necessary to buy stationery, fuel and light. The number of types of such commodities and services required will, of course, depend upon the character of the business.

The question arises: How will accounts with labor, fuel, etc. fit into the scheme of ledger accounts that we have thus far outlined? These items are examples of what are commonly called "expense" accounts, and they are frequently grouped in a special ledger. Now what is the nature of these items? As there is some confusion on this point, it is desirable to answer these questions with considerable care.

These items fall into the general category, property. This is fairly obvious in the case of such tangible items as fuel, stationery, etc. Coal in the bin is clearly just as good property as show-cases and other fixtures. Further, as was noted early in this chapter, the concept of property covers both material and immaterial items. This fact is too patent to need further elaboration. Hence labor power, the service of insurance, the service of advertising, the service of capital and so on, are all property items. They are all wealth in the economic sense, and they are all considered property by the business man. When the business man buys labor power and pays cash he does not think of the payment as a loss; he expects to receive a value equivalent for his expenditure, just as in the case of buying a machine, a building, or any item of physical property. Valuable services are just as fully property items as are valuable commodities. There is a simple way of proving that this is also the business man's and the accountant's way of looking at it. If one approached the owner of some business with the idea of buying him out, what would the prospective seller include in a statement of his property?

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Certainly coal in the bin and the stationery on hand as well as merchandise, fixtures, etc. would appear in that statement. And further, if any labor services, insurance services, advertising services, or any valuable services or rights have been purchased but are not yet consumed or from which the benefit has not yet been received, you will find the business man including them as part of his property. And this is also the accountant's viewpoint, for in making up a statement of property from the books and an inventory all balances representing so-called expense items not consumed will be included among the assets—essentially the same procedure as is followed in the case of buildings, machinery, or any property item.[6]

Then if these accounts represent property why call them expense accounts? There are practical reasons for distinguishing these items from other forms of property, and it is not our intention to obliterate the distinction. Distinctions may well be observed for certain purposes, similarities for others. It cannot be too emphatically urged that as far as the theory of debit and credit is concerned there is no distinction whatever between property accounts and these so-called expense accounts. The difference between buildings and coal is not that one is property and the other expense or property consumed; the only line that can be drawn is the relative *permanence* of the former as compared with the latter. The coal in the bin may be largely consumed in a month; the building may last twenty years. The coal is a current, transitory asset; the buildings are of a more permanent character. The distinction made in economic theory between circulating capital and fixed capital is practically the same distinction.

Strictly interpreted the word expense should mean actual decay, dissipation, or consumption of property. The amount of coal that is consumed constitutes an expense—an expiration of property. But so also is the extent to which the building wears out in a certain period an expense. *All expirations of property are expenses; all balances left on hand are property.*

Let us suppose that the following headings comprise all the assets of this transitory character that will be used by the A. B. Co.: Labor; Fuel; Insurance; and Stationery; there would be others but these are sufficient for illustrative purposes. According to the above analysis, accounts would be opened for these items in exactly

[6] The inventory and its necessity will be discussed in Chapter IV.

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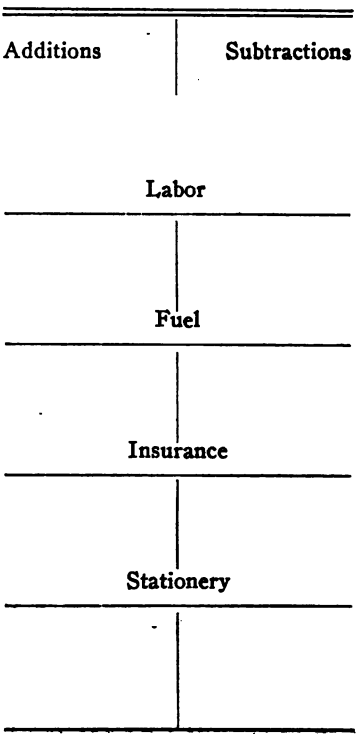
the same way as for any property items—the left-hand column being used for additions, the right-hand column for subtractions; thus:[1]



In the preceding chapter the point was emphasized that one important purpose of the financial records is to show the increase or decrease in the proprietor's equity in a given period, and the process

[1] These transitory property accounts are sometimes considered as subdivisions of the proprietor's account on the ground that the net result of all expenses and all gross incomes is finally embodied in proprietorship. But this is not an accurate conception. It is not the additions to property that are expenses, but the expirations of property (strictly speaking it is the net expiration of property that is not used to pay debts that forms expense or gross deduction from proprietorship). Then if any property accounts are to be considered as subsidiary proprietorship accounts all property accounts must be so considered; for one expiration of property is as much an expense as any other.

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whereby this change is attained. Because of complexities in the actual business process, the analysis of the accounts which record this net change in proprietorship presents certain difficulties.

Revenue, or subsidiary proprietorship accounts, are necessary to record the additions to the proprietor's equity which occur through the sale of the proprietor's service embodied in the finished product. It is impossible in practice to determine *all* expirations of property which have occurred in the process of production, concurrently with the additions to property made from the sale of product. Such expirations are those which are due to business operation and the passage of time (e. g. the consumption of coal in the furnace; the wear and tear of buildings.)

Consequently the additions made to the proprietor's equity in the revenue accounts when product is exchanged for other property are *gross* and not *net* additions to proprietorship. It becomes necessary, then, at certain intervals to subtract from the proprietor's equity the decreases in property not previously recognized in the records. This could be done by making subtractions from the revenue accounts directly, or these subtractions might be listed in *distinct* expense accounts; in which case the net change in the proprietor's equity may be determined by combining both of these groups of accounts in the Expense and Revenue Statement.[8]

Then *expense* and *revenue* accounts may properly be considered as subsidiary equity accounts, recording gross deductions from and gross additions to proprietorship; and the construction of such accounts is exactly analogous to the equity accounts already described.[9] Items of expense will be listed in the left-hand column of the Expense account because these amounts constitute gross subtractions from the proprietor's equity.[10] Items of revenue, which constitute gross additions to proprietorship, are listed in the right-hand column of the Revenue account.

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[8] In Chapter IV the adjustments necessary because of the limitations of the financial records will be further explained.

[9] cf. Hatfield, *Modern Accounting*.

[10] If expirations of property which are entirely unlooked for, and cannot reasonably be said to occur in the production of the product, are listed in distinct accounts, such decreases in property become a *net* decrease in proprietorship. Loss by theft might be considered as an example.

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These accounts may be subdivided for statistical purposes almost indefinitely. We will suppose that the A. B. Co. uses but two such accounts, one for expense items and one for revenues.

Almost any property or equity account may have a subsidiary account. Whenever we desire to take special cases of subtractions from either a property or an equity account and set such subtractions up in a separate account, the new account, simply represents part of the main account, or is, in other words, subsidiary to the main account. Such accounts are usually called "off-set" or "valuation" accounts. There is nothing about any such accounts that invalidates the explanation of the double-entry system thus far outlined. Each valuation account is so constructed as to preserve the balance of the main account, be it a property or an equity account, in the proper column. Such accounts are further illustration of the book-keeping practice of adding instead of subtracting. The need in particular cases for preserving original figures is the legitimate excuse for such a procedure. Common examples of such accounts are: Reserve for Bad Debts, an offset to Accounts Receivable; and Deficit, an offset to the proprietor's equity.

Finally it should be noted that the analysis of accounts thus far developed has recognized only pure accounts; that is, accounts which record but one of the important classes of facts. In actual practice many of the accounts frequently combine both equity and property elements. Some accounts are usually in this situation, other accounts become "mixed" only at intervals. Almost any account can be used in this way, especially among the property accounts. Even the summary statement of property and equities might be properly considered as an account involving all the properties and equities in the business. A further discussion of mixed accounts and an explanation of the important examples will be given in Chapters III and IV.

Let us summarize the discussion thus far by representing the complete scheme of accounts in its relation to the fundamental classification:

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The A. B. Co.'s Ledger Accounts [11]

Properties		Equities	
Additions	Subtractions	Subtractions	Additions
Buildings		A. B. Co.	
$130,000			$200,000
Real Estate		A. B. Co.	
$ 60,000			
Furniture and Fixtures		Expense	Revenue
$ 30,000			
Merchandise		Bonds	
$ 80,000			$100,000
Cash		Notes Payable	
$ 20,000			$ 20,000
Accounts Receivable			
	Reserve for Bad Debts		
Labor			
Fuel			
Insurance			
Stationery			

[11] No attempt is made to make this list of accounts complete. Enough are shown to illustrate the various cases.

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Analysis of Transactions

To better understand the above analysis let us suppose a few typical transactions taking place, and note how they are entered and how they affect the accounts.

a. $300 in cash is paid for fuel. This illustrates a very common type of transaction. One kind of property is paid out and an equal value of another kind of property is received in exchange; there is a subtraction from asset and an equal addition to another. Proceeding in the way that has been outlined an entry of $300 must be made in the right-hand column of the Cash account, and an equal entry in the left-hand column of the Fuel account. Thus we have two equal entries in opposite columns, and the original equality between property balances and equity balances is undisturbed. If the A. B. Co. found that there was too large an investment in fixtures and sold for cash $1000 of such equipment at cost price we would have another illustration of this type of transaction. It would be recorded by a right-hand entry of $1000 in the Furniture and Fixtures account and an equal left-hand entry in the Cash account. Such transactions obviously affect only one of the fundamental classes: viz. property. They are all recorded in this way.

b. The A. B. Co. is planning some considerable purchases and borrows $5,000 from the bank on a sixty-day note. Here property is increased and at the same time an equity, Notes Payable, is increased; an addition to Cash and an equal addition to Notes Payable. We would then have a left-hand entry of $5,000 in the Cash account and an equal right-hand entry in the Notes Payable account. Again we have two equal entries in opposite columns and the equation: *property* equals *equities* is maintained. This transaction affects both of the fundamental classes but does not disturb the separation of the two kinds of facts or their equality. The opposite of this transaction would be: The A. B. Co. pays a note due with cash $1,000. Here we have a decrease in property, Cash; and an equal reduction in an equity, Notes Payable. Hence we would have a right-hand entry in the Cash account and an equal left-hand entry in the Notes Payable acount. All transactions of the type which involve an addition to property and an equal addition to equities, or a subtraction from property and an equal subtraction from equities are recorded in this way.

c. A transaction may involve a transfer from one kind of equity to another. For example: the A. B. Co. issues new bonds to the extent of $5,000 in exchange for $5,000 of outstanding notes payable. Here we have a subtraction from one kind of equity and

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an equal addition to another equity. The transaction would be recorded by a right-hand entry of $5,000 in the Bonds account, and an equal left-hand entry in the Notes Payable account. Again two equal entries in opposite columns.

d. A transaction may involve some combination of the above types. For example: Merchandise which cost $8,000 is sold on account to various parties for $10,000. One kind of property, Merchandise, is reduced to the extent of $8,000 and another kind of property, Accounts Receivable, is increased $10,000. The difference, $2,000, represents revenue, a gross addition to the A. B. Co.'s equity. There would be a right-hand entry of $8,000 in the Merchandise account, and a right-hand entry of $2,000 in the Revenue account, and a left-hand entry of $10,000 in the Accounts Receivable account.[12] Again we have equal entries in opposite columns.

Although there may be a great variety of combinations of the above cases, these illustrations cover the fundamental types of transactions possible. It will appear from the foregoing that every transaction is two-sided, i. e. there is always an equal right-hand entry for every left-hand entry and vice-versa; hence the original equality between the sum of the left-hand (property) balances and the sum of the right-hand (equity) balances is continually maintained. This constant equality furnishes a very important test for numerical accuracy.

Debit and Credit

In practice the *left-hand* side of all ledger accounts is called the *debit* side and the *right-hand* side is called the *credit* side. In nearly all explanations of double-entry book-keeping an attempt is made to attach the significance of the words, debtor and creditor to the terms debit and credit as used in modern accounts. As used in personal accounts these meanings can with reason be applied; for example:

John Jones
(In account with the A. B. Co.)

Dr.	Cr.
$500	$100

[12] It should be noted that in practice Merchandise and Merchandise Revenue are often combined and we have an illustration of a mixed account. The two are separate here to facilitate the explanation. The ordinary Merchandise account will be discussed in Chapter III.

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Here the debit and credit headings of the opposite columns may be thought of as having real meanings. Jones is debtor to the A. B. Co. for the sums listed in the debit side and creditor to the A. B. Co. for the sums listed on the credit side. But the terms debit and credit are applied to left- and right-hand columns respectively of *all* accounts in the double-entry system, and it is impossible to attach such meanings to debit and credit elsewhere than in personal accounts.

Debit and credit are merely conventional terms used to designate left-hand and right-hand columns on the ledger page; and we shall use these expressions with this significance.

Summary

The double-entry system of keeping accounts is founded logically in the nature of the facts with which accounting deals. These data consist fundamentally in the two classes, *property* and *equities* (rights in property). These two classes are always numerically equal; for one class consists in the objective items of property, the other class represents the situs of the ownership of the same property, and the same measuring unit is used in both cases. The essence of the double-entry system consists in the separation of the members of the equation: property equals equities, and the maintenance of this equation. Thus the double-entry method is more than the mere recording of facts. The first step in the interpretation of data is made in the forming of the two fundamental classes.

Business operation means a constant process of shifting in both property and equity terms. Property expires, is replaced, is exchanged. Any property item may be increased or reduced. Similarly the process of change will mean increases or decreases in specific equity items. Accounts with the various items of property and equities are built up to record these changes. The important characteristic of any ledger account is: two columns, one for additions, the other for subtractions.

Arbitrarily we decide to maintain property balances in the left-hand column and equity balances in the right-hand column. Therefore, in property accounts the left-hand column is used for additions, the right-hand for subtractions; and in equity accounts just the reverse is true. The only principle controlling the arrangement is the maintenance of the original equation.

A complete system of accounts will usually embrace property items of a relatively permanent character, such as buildings, and likewise numerous kinds of property of a transitory character, such

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as coal. Further, in order to keep the business process clearly in view subsidiary proprietorship accounts will be needed: (1) those accounts representing expense or gross deductions from proprietorship; and (2) those accounts representing revenue (accounts which embody the sale of the proprietor's service) or gross additions to proprietorship. Finally almost any account may have a subsidiary valuation account when for any reason subtractions or off-sets are entered in a special account rather than in the proper column of the main account.

All possible transactions can be classified under four heads: (1) property is exchanged for an equal value of another property; (2) an increase or decrease of property takes place through an equal increase or decrease of equities; (3) an equity is exchanged for an equal amount in another equity; (4) a transaction may involve some combination of the above. In any of these cases equal entries in opposite columns are made for every transaction. Consequently the original equality existing between left-hand balances and right-hand balances is maintained. An important advantage of the double-entry system is the test for numerical accuracy afforded by this constant equality.

The left-hand side of any account is called the debit side, the right-hand is called the credit side. The simplest rule for debit and credit is based directly upon the fundamental equation. *Debit additions to property and subtractions from equities; credit additions to equities and subtractions from property.* The terms debit and credit have no other important significance as used in modern accounts.

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III

THE CLASSIFICATION AND RECORDING OF TRANSACTIONS.

In the last chapter the fundamental principles of the double-entry system were explained, but with little reference to the details of book-keeping. It is the purpose of this chapter and the next to describe briefly the most important forms which are used in recording business data; the process of opening accounts, recording transactions, and closing the accounts; and the making of summary statements for the purpose of drawing conclusions.

The Books of Record and Account

There are but two books of fundamental importance used in recording business transactions: the *journal* and the *ledger*. A great many supplementary forms and auxiliary records may be necessary if the business is very complex; but in any case the fundamental books are the above mentioned. The process of analyzing and recording transactions can best be described in terms of these books. Each transaction that occurs must be classified into debit and credit items. This process of analysis is commonly spoken of as "journalizing" because of the practice of recording this classification immediately in the journal. Further, the debit and credit items must be listed in compact form in the left-hand and right-hand columns of the proper accounts. The ledger is the book which contains the accounts. This procedure is purely arbitrary. The transaction must be analyzed and entered in accounts, as described in the preceding chapter, if the double-entry system is to be used; the use of two books to record this process instead of one, however, is purely a matter of clerical convenience. There is a growing tendency to reduce the financial books proper to simply the books of account. We shall use the device of the simple journal entry throughout, however, as a representation of the process of analysis. A brief explanation of the simple forms of journal and ledger follows.

The journal, as described above, is the book of original entry. It can be considered as having two functions: first, it records the classification of transactions into debit and credit items; second,

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it gives brief details in connection with each transaction. A section of a simple journal page would look something like this:

	January 1		
46	Coal	$ 300.00	
42	Cash		$ 300.00
	Bought for cash 50 tons soft coal at $6.00		
42	Cash	1,000.00	
61	Furniture and Fixtures		1,000.00
	Sold 4 showcases at cost price for cash		
	January 2		
42	Cash	5,000.00	
75	Notes Payable		5,000.00
	Borrowed $5,000.00 from the First National Bank on our 60 day note at 6%		

The left of the two columns at the right of the page is the column in which are listed the debit amounts. The right-hand column is for credit items. The name of the account which is to be credited is indented to the right. In the column at the left of the page are given the ledger page numbers of the various accounts involved; these ledger page numbers should always be given in the journal to facilitate comparison of the two books whenever need for such comparisons arises.

The importance of the journal when considered as representing the primary analysis of the transactions is evident. The structure of the double-entry system depends upon a debit and credit classification of items; and an orderly statement of the important details connected with each transaction is very necessary for future reference in case of misunderstandings, audits, legal complications, or other contingencies. It should be noted that many of the original details may be recorded in other books than the journal proper. Notes Payable and Note Receivable registers may be kept, for example, in which are recorded the details in connection with these types of paper. Various other kinds of memoranda are used to record original data; and, of course, original documents such as receipts, vouchers, bills of lading, etc., are to a great extent preserved and kept on file to supplement the books proper.

The ledger, as explained above, is the book of final account. It is the book of the accounts proper, representing the organiza-

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tion of the debits and credits of the journal into compact form and allocated to the various accounts affected by the transactions. A ledger account has the following form:

Furniture and Fixtures

Jan. 1		J1	30,000	Jan. 6		J2	1,000

Usually, as in the above, the ledger contains simply the heading or name of the account, the date of each entry, the journal page on which may be found the original entry, and the amount. Sometimes the name of the account that contains the concurrent opposite entry is written in. There are not many cases in which this is necessary; if the journal page is given, the particulars of the transaction can be readily ascertained. The particular function of the ledger is to summarize the transactions in connection with each account so that conclusions concerning the status of that account at any moment may be drawn.

The ledger, as well as the journal, may be divided into a number of special books, the extent to which it is expedient to carry this subdivision depending upon the nature of the enterprise in any case. The most common examples of such specialized ledgers are: the "expense" ledger, containing transitory property accounts and real expense accounts (sometimes only the former); the "customer's" ledger, containing the accounts receivable (a separate account for each individual or firm); the "purchases" ledger, containing the accounts payable (a separate account for each person or firm). The cash book, which is primarily a journal of transactions involving cash, may also be used as a ledger containing the single account Cash. The "general" ledger includes all the accounts not contained in the special ledgers and usually controlling or summary accounts of the special ledgers as well. For example, the general ledger may have an Accounts Receivable, which is a summary account of the customer's ledger.

JOURNALIZATION

As has been stated, one function of the journal is the classification of items on the basis of debit and credit, or left-hand and right-hand entries. Thus it is apparent that "journalization" involves more than the mere recording of facts. The first, and a very important, step in interpretation is taken in the process of grouping debits and credits. For this classification makes the fundamental

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distinction between property items and equities. If the bookkeeper is handed a memorandum on which are given the details of the transaction, and on which it is already indicated for him which entries are debits and which are credits, then journalization from that point is mere copying or recording, for the important process has already been completed.

The fundamentals of journalization have already been brought out in the analysis of the general theory of debit and credit in Chapter II. It remains to discuss the details of the process somewhat more fully. Although the second function of the journal given above, that of noting the important details in connection with each transaction, is of importance, it presents no difficulty, and consequently it is with the grouping of debits and credits that we shall be largely concerned. This grouping is of primary importance, and it is a matter which presents some difficulty. Consequently we shall repeat the classification developed in Chapter II and analyze some additional illustrative cases.

This classification covers all possible transactions. Our discussion of journalization at this point must necessarily be formal; as we proceed, however—and especially in the chapter discussing the process of closing the accounts—more specific description of the nature of the entries can be given.

a. Transactions occur which involve the exchange of valuable commodities or services for other commodities or services of equal value. These are pure property transactions: the exchange of property values. In such cases credit always means a subtraction or offset, and debit means an addition.

EXAMPLES

1. The A. B. Co. loan $500 to Smith Bros. in exchange for their sixty-day note at 6%. What would be the journal entries in this case? There has been a payment of $500 from Cash and an addition of $500 to another kind of property: Notes Receivable. The entries would then be:[1]

Notes Receivable	$500	
Cash		$500

[1] Entering a debit item is usually called "charging": to debit an account is to charge an account. Entering credit or right-hand items is called "crediting." The word *to* is often used; thus:

Notes Receivable
to Cash

The use of the preposition serves no purpose except to indicate further which item is a debit and which a credit. The best method to follow in journalization is to set the debit item at the left and the credit item at the right If this is done there is no need of any further explanation.

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2. Merchandise to the amount of $2000 is bought for cash from Rankin & Co. We have a subtraction from Cash and an addition to Merchandise. Consequently a debit to Merchandise and a credit to Cash, thus:

Merchandise	$2000	
Cash		$2000

3. The furniture and fixtures are insured for $25,000 for three years. The premium of $250 is paid in cash. Here the service of insurance is secured for three years and cash is parted with to the amount of $250. A left-hand or debit entry to Insurance and a right-hand or credit entry to Cash:

Insurance	$250	
Cash		$250

4. A check is drawn for the weekly payroll, $400. Labor services are purchased and cash is paid out.

Labor	$400	
Cash		$400

b. Transactions frequently occur which mean an increase or decrease in property and an equal increase or decrease in equities. The complete rule for debit and credit is necessary to cover all such cases. Debit indicates an addition to property or a subtraction from equities; credit indicates a subtraction from property or an addition to equities.

EXAMPLES

1. The A. B. Co. pays notes to the amount of $5,000 with cash. Here an outside equity is reduced $5,000 and there is a corresponding reduction in a property account: Cash. The transaction would be journalized by a left-hand entry to Notes Payable and a right-hand entry to Cash:

Notes Payable	$5000	
Cash		$5000

2. Merchandise is bought on account from Rankin & Co. to the amount of $3,000. Property has been increased and an outside equity, Accounts Payable, has been increased to an equal amount. The entries would then be:

Merchandise	$3000	
Accounts Payable		$3000
(Rankin & Co.)		

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If this merchandise has been purchased with a note, the only difference in the entries would be that another equity, Notes Payable, would be credited instead of Accounts Payable.

3. The directors decide that $2,000 represents the accrued depreciation on buildings for this year, and the book-keeper is ordered to show these facts in the accounts. Here we have a subtraction from property value of $2,000 and a gross deduction from the proprietor's equity. A simple form of the entries would be:

Expense (Depreciation)	$2000	
Buildings		$2000

4. The A. B. Co. needs more capital; and new bonds are sold at par to the amount of $5,000. We have an addition to property and an equal addition to an equity. Accordingly the entries are:

Cash	$5000	
Bonds		$5000

c. Transactions may occur which affect only the equities. One equity may be increased and another decreased. The refunding of securities; the division of surplus into a variety of forms; such as: the declaration of dividends, the exchange of securities for other equities (e. g. the funding of a floating debt of general creditors' accounts into bonds or other securities): all these operations involve the exchange of equities, and do not affect the property accounts. The simplest illustration would be the exchange of notes and accounts payable. The A. B. Co. give their sixty-day note at 6% for $1000 to cover an open account of that amount. The entries would be:

Accounts Payable	$1000	
Notes Payable		$1000

The more complex illustrations of this type of transaction will be discussed in Chapter V.

d. A great number of transactions represent combinations of the above types. A common illustration of such a transaction is found when a so-called "mixed" account is involved. A mixed account is one that represents both property and equity elements. Whenever cost prices and selling prices are used in the same account, or, in other words, whenever the sale of the proprietor's service is incorporated in a property account, is one illustration of

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a mixed account[2]. The Merchandise account as often kept in the retail business is a good example. The left-hand or debit side of such an account stands for property; merchandise is entered at its cost to the firm. On the credit side, however, selling prices are used. This means that the credit side of this account represents not only subtractions from property but also revenue or gross additions to proprietorship. Since *credit* stands for both subtractions from property and additions to equities; it is entirely logical to have these items entered on the same side.

Suppose cash to the amount of $8000 is received from the sale of merchandise. The entries would be:

Cash	$8000	
Merchandise		$8000

Here the credit of $8000 to Merchandise represents not only a subtraction from property but also a gross addition to current proprietorship, assuming that the goods are sold at a price which produces revenue.

All possible transactions are covered by the above analysis. The application of this analysis to more complicated transactions will become evident as we proceed. It should be emphasized again that journalization represents a highly important step in interpretation; for this is the process which classifies items on the basis of debit and credit.

Posting

The process of transferring items from the journal to the ledger is known as *posting*. It is purely a clerical matter. Once a transaction has been journalized the debit and credit classification is made. Posting then involves simply the putting of all debits as indicated by the journal into the left-hand ledger column and in the proper accounts and all credits into the right-hand ledger column and in the proper accounts.

Where the journal is of the simple form—having but two columns, one for debits and one for credits—posting is obviously a

[2] There are two kinds of "mixed" accounts. The credit side of the merchandise account is mixed in that each amount really involves both property and equity elements. Part of the amount represents the subtraction or withdrawal from merchandise on hand; the balance indicates the revenue made on the sale (supposing there is a revenue.) Another kind of mixed account is illustrated by the ordinary commercial interest account. Here property and equity elements are both present in the same account, but the amounts are distinct.

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tedious process. Each entry must be taken separately; for every debit entry in the journal there must be a debit item posted to some ledger account, and for every credit entry there must be a separate credit posting.

A modification of the older type of journal as shown above is the special-column journal. This is the type in general use. Each account which is likely to be affected by many transactions is given a special column in the journal page, or two columns if the account is one in which debit and credit happenings will both occur frequently. The following represents the principle of such a journal:

Debit Columns						Credit Columns			
Cash	Accts. Rec.	Mdse.	Sundries	Ledger page:		Sundries	Mdse.	Accts. Rec.	Cash
					(Date)				
					(Account to be debited)				
					(Account to be credited)				
					(Details)				

A further modification of the journal is its subdivision into a number of special books, each dealing with some important phase of the business. The most common examples of such subdivisions are the sales book, the purchase book, and the cash book. Each of these is a specialized journal for making original entries in regard to the particular classes of transactions which are suggested by the titles of these books. This development of special journals may be carried just as far as it is expedient to do so in view of the number of transactions affecting any account. The following illustrations represent the nature of such special journals:

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CASH BOOK

Debit Side

(Date)	Ledger page	(Name of acct. to be credited.) (Details)	Mdse.	Accts. Rec.	Notes Rec.	Sundries

Credit Side

(Date)	Ledger page	(Name of acct. to be debited.) (Details)	Mdse.	Accts. ~~Rec.~~ Pay	Fuel	Labor	Sundries

SALES BOOK

(Ledger page)	Date (Account to be debited) (Details)	Accounts Receivable	Sundries

PURCHASE BOOK

(Ledger page)	Date (Account to be credited) (Details)	Accounts Payable	Sundries

In the sales book the "account to be debited" refers to the individual account in the customers' ledger or to sundry accounts such as Notes Receivable. Accounts Receivable is the controlling account in the general ledger. The purchase book shows an analgous situation. Cash sales and purchases are included in these books if no special cash book is kept. But when a cash book is used it is better practice to omit cash sales and purchases from these mer-

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chandise journals. Useless duplication is thus avoided and total sales can be readily ascertained by adding the total from the merchandise column in the debit side of the cash book to sales as shown by the sales book.

The development of the improved journal has been of great practical importance because it greatly reduces the labor of posting. Consider for example the process of posting from the cash book. The cash book is a subdivision of the journal in which are entered all transactions affecting cash. The special column principle may also be used. At the end of the day or week, when the book-keeper posts, instead of making one debit posting in the ledger for each item appearing on the left-hand side of the cash book, he may carry the *total* of all such items to the debit side of the cash account in one posting. Thus one debit posting to the cash account may take the place of a hundred or more separate items; and a similar saving in labor is made in posting the right-hand side of the cash book to the credit side of the cash account.

Further, for each account which has a special column in the cash book, only one posting is necessary at the end of the period. The only items which must be posted individually are those in the column headed "Sundries"; this column includes all items affecting accounts which are not considered sufficiently important to be given a separate column.

In posting from the sales book the total of the Accounts Receivable and Sundries columns is posted to the credit side of the Merchandise account, or to an account called Sales. The total of the Accounts Receivable column is posted to the debit side of that account in the general ledger. The various accounts receivable must also be posted item by item to the individual accounts in the customer's ledger. Sundries must be posted item by item. Posting from the purchase book is done in a similar manner.

These illustrations are sufficient to show how greatly the process of posting can be abridged by the use of special-column and specialized journals. These improvements in the journal have been made for no other purpose than to facilitate posting.

The Common Accounts

In Chapter II accounts were classified as (1) property accounts; (2) equities. This classification represents a fundamental distinction and should always be kept in mind in the process of analyzing accounts. Three supplementary types of accounts were described: (1) current or subsidiary proprietorship accounts (expense and revenue accounts); (2) valuation or offset accounts

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(which may be either subsidiary equity accounts or subsidiary property accounts); (3) mixed accounts (accounts embodying both property and equity elements). This classification is exhaustive and is sufficient for purposes of general analysis. It will now be necessary, however, to classify in more detail the common accounts with which we shall have to deal.

a. We may group together those accounts which represent the more permanent types of property. Buildings, land, machinery, are common examples of such kinds of property. Any accounts which represent the more durable equipment of the business may be put in this class; such accounts, for example, as comprise the classification "Investment in Road and Equipment" prescribed for the railroads by the Interstate Commerce Commission. The debit side of such accounts is used to record additions. These additions should not be thought of primarily in the physical sense. The data with which accounting deals are *values,* measured in terms of the money unit. Additions to property, then, mean value additions; and increases in property value may take place either through an advance in the level of prices or through the securing of additional physical property.

Entries in the credit side of these accounts represent subtractions. These subtractions may be of two sorts: (1) credits may represent the sale of property; i. e. the exchange of one kind of property for another; (2) credits may represent the decay of property value in connection with business operation. In the case of a profitable enterprise there is a sense in which decay of property values or depreciation may be thought of as the exchange of one kind of property for another, for certainly capital is replaced from the sale of product; but entries covering the expense expirations of property cannot be made concurrently with the additions to property from the sale of product as was stated in the last chapter. Hence it is desirable to keep in mind the distinction between these two kinds of subtractions from property.

Then debits to Buildings, for example, always mean additions to property value, either because of physical additions to this sort of property or because of appreciation[3]. Credits, mean subtractions from property value, either because of the actual sale of property or the expiration of property value incidental to business operation and the passage of time.

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[3] The question as to whether appreciation can legitimately find its way into the accounts is a serious one and will receive careful consideration later in the text. See Chapter VI.

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b. Merchandise, Supplies, Materials, Goods in Process, Finished Goods, etc., form another group of property accounts. These accounts represent items of property that move more rapidly through the business than the properties that constitute the more permanent equipment. They present no peculiarities in analysis with the exception of the cases in which such accounts become mixed accounts. The account, Merchandise, in the retail business is often such an account, representing both property and equity elements. In factory accounting, however, where one meets with such accounts as Goods in Process, and Finished Goods, these accounts usually represent nothing but property. That is, cost prices and selling prices are not used in the same account; and gross profits are figured from the Sales, and Cost of Sales accounts. The nature of the ordinary merchandise account was sufficiently explained in the discussion of journalization.

c. Cash is an account found almost universally. Cash, being legal tender, is necessary in business operation. (Checks, money orders and bank drafts, as well as actual currency, are commonly considered as cash when received or paid). It is the most "liquid" form of property. There are other assets, however, that are readily convertible into cash; and we shall include the accounts representing such items with Cash in this group. Such are accounts representing stocks, bonds, mortgages—in fact any marketable securities. The peculiarity of the Cash account is that depreciation and appreciation are not considered as taking place in connection with cash. The value of the dollar varies, but this of course, does not appear in the cash accounts. Debits or credits to the Cash account then mean additions or withdrawals in direct property exchanges (except in the case of lost or stolen cash.) Likewise, securities are usually maintained on the books at cost, although it is a question whether this procedure is legitimate, for security prices do change.

d. Certain property accounts represent rights against other parties. The common examples are: Notes Receivable, and Accounts Receivable. These accounts show few peculiarities. Debits mean additions; credits indicate subtractions. Appreciation is, of course, impossible in connection with such accounts. Depreciation, however, occurs. In every business a more or less considerable subtraction must be made from the face of the Accounts Receivable in lieu of bad debts. It is common practice to credit another account, Reserve for Bad Debts and leave the main account showing original figures. Such an account becomes a subsidiary of Accounts Receivable and, if it also contains the estimated bad debts on the notes, of Notes Receivable.

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The beginner often experiences some difficulty in making the entries involved in transactions which affect Notes Receivable, or Notes Payable, and Interest. (The Interest account will be fully explained in the next chapter.) We will give a few illustrations.[4]

1. Merchandise $1000 is sold and a 6% note for sixty days is received. As we have learned the entries would be:

Notes Receivable	$1000	
Merchandise		$1000

With fifty days yet to run the note is discounted at the bank at 6%. We receive the face of the note $1000 and one-third of a month's interest, $3.33. The entries would then be:

Cash	$1003.33	
Notes Receivable		$1000.00
Interest		3.33

The entry shows an addition to property, Cash, of $1003.33, and a subtraction from another kind of property, Notes Receivable, of $1000. The balance of the cash received, $3.33, is a payment for capital-service furnished by the proprietor; and the credit to Interest represents this revenue.

2. If the note received in the above transaction bore no interest, and was discounted at the bank fifty days from date of maturity at 6% the entries would evidently be:

Cash	$996.67	
Interest	3.33	
Notes Receivable		$1000

Here we have a debit to Interest, or a purchase of capital-service by the proprietor; for the proprietor is exchanging for cash today a promise to pay which bears no interest and hence will not be worth its face until maturity.

3. If the firm bought merchandise and gave in exchange a 6% sixty-day note, the entries upon maturity of the note would be:

Notes Payable	$1000	
Interest	20	
Cash		$1020

We have paid out cash of $1020 to settle an obligation of $1000 and to pay for capital-service furnished to us. Thus this is a

[4] See Chapter VII for further illustrations of entries involving interest.

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"mixed" transaction representing a subtraction from property, a subtraction from an outside equity, and the payment of $20 for valuable services rendered to us. If this note were non-interest bearing, its payment would represent simply a subtraction from property and an equal subtraction from a liability.

Accepted bills of exchange (sight drafts) are in effect promissory notes, and are usually carried in the Notes Receivable and Notes Payable accounts. Until such an instrument is accepted, however, it is good practice not to formally enter the transaction. Even if cash is received immediately at the drawer's bank, it is customary to simply make a memorandum to that effect, and not record the data in the books proper until the notification that the paper is accepted.

e. A fifth-class of property accounts represents all those assets of a current, transitory nature which are commonly misnamed expense items. The analysis of accounts in Chapter II classed these among the properties. Common examples of such accounts are: Advertising; Stationery; Fuel; Light; Power; Interest; Freight and Cartage; Labor; Commissions; Insurance; etc. These accounts are debited whenever the commodities or services which they represent are purchased. It is sometimes said that a peculiarity of such accounts lies in the fact that the credits are not entered concurrently with the withdrawals—or use of these property items. That is, there is no attempt made to make an entry in the coal account every time a shovelful of fuel is consumed. This is true, but it is no peculiarity of this class of accounts. In all property accounts subtractions which represent expiration of property value in the operation of the business are made only at intervals, usually at the close of the period; subtractions which represent immediate property exchanges are made at the time the transaction is consummated. This point will be further explained in the discussion of the closing of accounts in the next chapter.

f. To complete this cursory description of property accounts we will only mention those accounts which represent the values of privileges conferred by government:—copyrights, patents, franchises; and the value of public opinion peculiar to the individual concern—goodwill. The accounts representing these various intangibles have one general peculiarity; entries are made in such accounts not concurrently with ordinary business transactions, but only on certain occasions such as organization or reorganization; and hence such entries are peculiarly estimates.

g. An important group of the equity accounts are those representing *outside* claims on the property of the business. The common

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examples are: Bonds; Notes Payable; Accounts Payable; Mortgages. These equities differ from property accounts in that they do not depreciate except in case of insolvency. Hence debits always indicate reductions made by paying the obligation with some kind of property (usually cash), or by exchanging one equity for another. Similarly credits mean additions made concurrently with the receipt of property, or the reduction of another liability.

h. Accounts are frequently met with which represent liabilities of a more current, transitory character than any of these. Examples of such accounts are: Wages Payable; Interest Due and Unpaid; Taxes Payable; etc. Such liabilities as Wages Payable are often represented in the general labor account and not shown separately[5]. Entries in these occounts are made on exactly the same principle as entries in any of the outside equity accounts.

i. (1) Accounts are kept showing the proprietor's equity—the original and accumulated proprietorship. The chief distinction between the double-entry and the so-called single-entry methods is that the former system includes this group of accounts while the latter does not. In a partnership accounts headed with the names of the different partners may be used to represent the proprietor's equity. In the case of a corporation, the capital stock accounts and the surplus accounts represent proprietorship. Capital Stock may be said to represent the original proprietorship (less the deficit if there was or is one, and assuming no stock dividends have been declared); and the surplus accounts represent profits retained in the business[6]. Surplus may be represented by a long list of accounts; such as: Undivided Profits; Surplus; Profit and Loss; Loss and Gain; (all of which mean abount the same thing)—and the various accounts which represent surplus set aside for a particular purpose; such as: Dividends Payable; Sinking Fund Reserve; etc.

The transactions affecting this group of accounts are made for the most part at the end of the accounting period; and hence cannot be well understood until the process of closing the books and making statements has been discussed. In these accounts as in all equity accounts debit indicates subtractions, credit indicates additions.

(2.) To indicate the sources of changes in proprietorship accounts are kept which were defined in Chapter II as *current* proprietorship accounts. Such accounts are those which represent revenue or gross additions to proprietorship; and accounts which represent

[5] See Chapter IV.

[6] This statement has some exceptions. See Chapter V.

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expenses or gross deductions from proprietorship (e. g. Depreciation; Bad Debts; Labor Power Consumed; Fuel Consumed, etc.)[r] Entries in the case of such accounts are made on the same principle as in any equity accounts.

j. A final class of accounts already noted is the offset or valuation accounts. The relation such accounts bear to the general structure has already been sufficiently explained. From time to time we shall have occasion to discuss examples of such accounts. The point to be emphasized here is that an offset account, whether it be subsidiary to a property account or to an equity account, must always be considered in connection with the parent account; and the entries in such an account can only be interpreted in view of its relation to the main account.

The classifying of accounts in ten groups, as we have done here, is an arbitrary classification for the most part and has been used as a device for presenting a brief statement of the common accounts. As far as possible, however, distinctions of importance have been observed. The discussion of the closing of accounts in the next chapter will further explain the peculiarities of the different classes of accounts in the way they are actually treated on the books.

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[r] Expenses are often computed from property accounts and are not represented by separate accounts.

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IV

THE INTERPRETATION OF ACCOUNTS

As the operation of an enterprise proceeds, the transactions will be recorded in the manner described in the last two chapters. At certain periods the management desires to take cognizance of the firm's financial position. It will then be necessary to "close the books", and make statements showing the present status of the business.

The Trial Balance

The first step in the process of closing the accounts is the taking of a trial balance as a test for numerical accuracy. In the double

THE A. B. CO., JANUARY 31, 1916.

Trial Balance

Ledger page		Dr.	Cr.
3	Buildings	$130,000.00	
6	Real Estate	60,000.00	
6	Furniture and Fixtures	28,000.000	$ 2,000.00
11	Merchandise	122,643.18	56,024.01
42	Cash	57,989.43	31,764.39
36	Accounts Receivable	24,946.87	13,429.76
56	Notes Receivable	8,900.00	5,927.00
21	Labor	2,403.20	
27	Fuel	600.10	
31	Insurance	250.00	
32	Interest	200.07	63.17
29	Sales Discount	3,113.00	
41	Purchase Discount		2,916.14
23	Miscellaneous Supplies and Services	892.17	
12	Rent from Building		400.00
4	Capital Stock		200,000.00
5	Bonds		105,000.00
75	Notes Payable	6,000.00	20,000.00
17	Accounts Payable	19,200.00	27,613.55
		$465,138.02	$465,138.02

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entry system if the books are properly kept there is an equal debit for every credit and vice-versa. Consequently the total debits should equal the total credits. The trial balance is simply a summary transcript of the ledger showing total debits and total credits by open accounts (or debit balances and credit balances.) The table on page 53 illustrates such a statement.

The function of the trial balance is primarily to furnish a test of clerical accuracy. Only the open ledger accounts are collected in such a statement, for any accounts which exactly balance need not be included. Net debit or credit balances may be carried to the trial balance, or total debits and total credits, as in the statement shown above. The fact that the trial balance "proves" is not a positive proof of accuracy, but only a fairly reliable indication. There is a chance that the same error has been made on both sides. Further, this test cannot prevent errors of omission, or inaccurate analysis of the items in the transaction itself. It does indicate, however, that there has been posted an equal debit entry for every credit entry and vice-versa.

Closing the Accounts

The question now arises: Does the trial balance—which is a summary of the ledger accounts—show the financial condition of the business at a given moment of time? The answer is *no*; and the explanation of this answer shows that the part played by the keeping of the books in furnishing the data of the business process has very definite limitations. The purchases of property are recorded on the books as they occur, and direct property exchanges; expirations of property value—expense—are for the most part not so recorded. It would be altogether too laborious and complicated a process to attempt to record in the Fuel account the hourly or daily consumption of coal for example. The more permanent property equipment is no doubt depreciating in value continuously; it would not be feasible to present this fact continuously on the books. Thus the books do now show for the most part the consumption of property values due to business operation. The necessity for the inventory and the appraisal arises. If some of the subtractions of property values are not directly recorded on the books, inventories must be taken to determine the amount of property actually on hand, and consequently the amount of value that has expired. This sort of information is always necessary to supplement and correct the book records. The use

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of mixed accounts gives rise to a further need for the inventory. Whenever cost prices and selling prices are used in the same account an inventory must be taken to determine the amount on hand and also the amount of revenue realized on the sales.

Let us consider now the actual process of closing the accounts and preparing statements supposing the inventories to have been taken. We will take for our first illustration one of the more permanent property accounts: Buildings. This account shows a debit balance of $130,000 on Jan. 31st. No transactions have occurred during the month. It is decided that the buildings have declined in value ½% during the month; i. e. an appraisal would show now a value of $129,350. The expiration of property then, or the depreciation expense, amounts to $650. It is this latter amount that must be carried to the Expense and Revenue statement to represent the expense of this month's operation so far as buildings are concerned. The Buildings account closed would look like this:

BUILDINGS

1916					1916			
Jan. 1	Inventory	J2	130,000		Jan. 31	Depreciation Expense	J96	650
					Jan. 31	Inventory	<	129,350
			130,000					130,000
Feb. 1	Inventory	<	129,350					

The amounts entered on the right-hand side of this account represent the closing computation. The credit of $650 to Buildings represents a definite subtraction from property and requires a concurent charge to Depreciation Expense. This would be represented by a journal entry. It is a book-keeping habit to balance every account at the end of the period so as to mark the separation of the accounting periods sharply; and the balance is taken by adding to the opposite side to avoid actual subtraction. This accounts for the balancing inventory figure on the credit side. The left-hand inventory cancels the inventory entry on the opposite side and shows the actual balance on hand.

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Let us examine the journal entries necessary to close this account. If a separate account is now opened entitled Depreciation Expense, we would have this entry:

Depreciation Expense	$650	
Buildings		$650

A ledger account if often opened to summarize the expenses and revenues of the period[1]. Such an account shows offsets and expenses on the debit side and items of gross income on the credit side. It is thus virtually an Expense and Revenue statement. The net result of such an account is closed into the various proprietorship accounts. In such a case the item of depreciation expense would be closed into this account; thus:

Expense and Revenue	$650	
Depreciation Expense		$650

If no Depreciation Expense account is kept the entry would be the following:

Expense and Revenue	$650	
Buildings		$650

All of the accounts representing the more permanent property equipment are closed in a similar manner. The only property accounts from which neither expense nor revenue is computed are accounts like Cash which represent property that does not depreciate.

As an illustration of the closing of the second group of property accounts we shall take the Merchandise account. This account presents the complication of being, as often kept, a mixed account, comprising both property and equity elements. Using the figures in the trial balance shown above the Merchandise account shows total debits of $122,643.18 and total credits of $56,024.01. The first total represents the cost of all merchandise purchased during the period plus the cost of goods on hand at the beginning of the period; the credit total shows the total value of goods sold during the period at selling prices. Let us suppose the inventory shows goods on hand to the amount of $98,600 valued at cost. Then $122,643.18 less $98,600 gives $24,043.18, the cost of the goods sold. Subtracting this figure from $56,024.01 we have a differ-

[1] This account is called Loss and Gain, Profit and Loss, Expense and Revenue, or by a similar name.

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ence of $31,980.83, the merchandise revenue for the month. In closing the account this computation is shown thus:—

MERCHANDISE

1916					1916				
Jan. 1	Inventory	<	80,000		Jan. 31		S.B.	56,024	01
Jan. 31		P.B.	42,643	18	Jan. 31	Inventory	<	98,600	
Jan. 31	Merchandise Revenue	J96	31,980	83					
			154,624	01				154,624	01
Feb. 1	Inventory	<	98,600						

This method of closing illustrates again the book-keeping practice of adding to the opposite side instead of subtracting. The inventory brought down at the left cancels the balancing entry on the opposite side and shows the property balance on hand. At this moment of time the Merchandise account represents $98,600 in property and nothing else. It is well to think of this closing computation in the case of Merchandise or any similar account in the way stated above; total debits less the inventory shows the cost of goods sold; total credits less cost of goods sold shows revenue. The book-keeper, however, instead of using two instances of subtraction makes two additions on the opposite side and accomplishes the same result.

If a Merchandise Revenue account were now set up to record this item of revenue the entries transferring the item from Merchandise to Merchandise Revenue would be:

Merchandise $31,980.83
  Merchandise Revenue ... $31,980.83

When this revenue is carried to a general Expense and Revenue account we would have the following entry:

Merchandise Revenue $31,980.83
  Expense and Revenue ... $31,980.83

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If a special Merchandise Revenue account had not been kept, the item of revenue would have been carried directly from Merchandise to Expense and Revenue; thus:

Merchandise $31,980.83
Expense and Revenue ... $31,980.83

The debits to Merchandise in both of these cases represent not an addition to the left-hand side, but a subtraction of the revenue or equity element from the right-hand side; that is, such entries represent the transfer of an item of revenue from one account to another.

Accounts representing rights against other parties are closed in the same manner as are the equipment property accounts. Let us take the case of Accounts Receivable. In the trial balance given above this account shows total debits of $24,946.87, and total credits of $13,429.76. The debit total represents all of the entries made during the period indicating additions to this kind of property plus the balance from the preceding period; the credit total shows the amount of such claims that have been settled. We will suppose that a subtraction of $500 must now be made to take care of the estimated bad debts. After closing the account would look like this:

ACCOUNTS RECEIVABLE

1916					1916				
Jan. 1	Inventory	<	10,000		Jan. 31		C.B.	13,429	76
Jan. 31		S.B.	14,946	87	Jan. 31	Bad Debts Expense	J96	500	
					Jan. 31	Inventory	<	11,017	11
			24,946	87				24,946	87
Feb. 1	Inventory	<	11,017	11					

If a separate expense account, Bad Debts Expense, were opened, we would have the following:

Bad Debts Expense $500
Accounts Receivable $500

and closing this item into Expense and Revenue:

Expense and Revenue $500
Bad Debts Expense $500

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If no separate expense account for bad debts is kept, the entry would be:

Expense and Revenue	$500	
Accounts Receivable		$500

Usually a subsidiary offset account Reserve for Bad Debts is set up, and instead of crediting Accounts Receivable $500, the subsidiary account is credited with this amount. This is better practice because a subsidiary ledger usually lies back of Accounts Receivable, and the total balances of these accounts should equal the balance of the controlling account. In this case the two accounts taken together show the same facts as the one account shown above.

The closing of Interest presents some difficulty. In the trial balance above Interest shows a debit total of $200.07 and a credit total of $63.17. The debit total represents payments actually made for the use of capital during the period plus interest due the firm at the beginning of the period if there was any such accrual; the credit total shows the amounts received by the firm during the period for rendering the service of capital plus any interest owed by the firm at the beginning of the period. We will suppose that an examination shows at this date interest owed *by* the firm accrued but unpaid $700; and interest accrued owed *to* the firm and unpaid $75. The account, as closed, would look like this:

INTEREST

1916				1916			
Jan. 31			200 07	Jan. 31			63 17
Jan. 31	Inventory	<	700 00	Jan. 31	Inventory	<	75 00
				Jan. 31	Expense & Revenue	J96	61 90
			900 07				900 07
Feb. 1	Inventory	<	75 00	Feb. 1	Inventory	<	700 00

The closing journal entry would be:

Expense and Revenue	$61.90	
Interest		$61.90

The amount carried to Expense and Revenue represents the difference between capital-service received (payments for the

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period plus interest accrued and unpaid), and the interest receipts during the period plus the amount accrued due to the firm. The inventory brought down at the right shows the interest liability and cancels the inventory on the opposite side. When the $700 of interest accrued is paid it will be entered as any other payment for the use of capital on the debit side of the account.

It is important that the various elements represented in such a complex account be carefully distinguished. (1) All payments for the use of capital during the period are entered on the left-hand or debit side. These entries are analogous to the debits made when any valuable property, right, or service is purchased and paid for. (2) All payments received by the firm for furnishing capital to outsiders are entered as credits. These credits represent gross additions to the proprietor's equity in the business for they cover the sale of service by the proprietor. (3) The interest inventory which shows the amount of interest liability accrued is entered as a credit. (It is also entered on the debit side, for the purpose of making the closing computation.) This element of the interest account then represents a simple outside equity or liability[2]. (4) Interest payments due the firm are recorded as a debit inventory. This item obviously represents an asset. An asset inventory of a slightly different type would be *interest prepaid* by the firm, i. e. a portion of the payments made for the use of capital cover capital-service that has not yet been rendered to the firm.

It would be possible to use four accounts instead of one to record the different elements in the account we are considering; and whenever the item of interest is large, it is no doubt best to adopt this or a similar procedure. The titles of such accounts could be: (1) Interest Expenditure; (2) Interest Revenue; (3) Interest Expense Accrued (Liability); Interest Revenue Accrued (Asset). The first account would represent payments for capital-service made during the period. The entries in this account can logically be thought of as representing property at the time the service is purchased. At intervals the amount to which the service is consumed is transferred to an expense account. Such an account represent an expiration of valuable services; and a gross

[2] Very frequently accounts such as: Interest, Labor, etc., represent liabilities at the end of the accounting period (interest payable, wages payable, etc.) In such cases these accounts represent the claim of certain individuals or firms. It is convenient to use the Interest and Labor accounts for such items rather than accounts with the individuals involved.

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deduction from the proprietor's equity. At the time of this transfer any balance in (1) represents service for which payments have been made and is not consumed—an asset as good as any other property item. The second account mentioned represents revenue; the third represents a portion of the interest which is also a liability; and (4) Interest Revenue Accrued is strictly an asset.

Whenever a concern pays or receives bond interest it is good practice to open a separate group of interest accounts to distinguish this part of the interest transactions from the "commercial" interest arising in connection with notes receivable and notes payable. If there are several issues of bonds involved, it will often be advisable to keep separate interest accounts for each security issue.

The illustrations that we have just given are sufficient to explain the technique of closing the individual accounts, and to show how the process of taking inventories and making estimates and appraisals at the end of the accounting period fits into the system of gathering financial data. Two things have to be accomplished; first, we wish to discover in the case of each item of property—both commodities and services—that has been purchased during the period or was on hand at the beginning of the period to what extent there has been a value expiration, or to what extent the value of the item has been consumed in business operation; second, what is the actual balance on hand at the moment of time in the case of each property item. The total of all these property expirations gives the total expense, or the subtraction from revenue for the period; the total of all balances on hand represents the total value of all property at the end of the period. Further, the inventory in the case of a mixed account such as Merchandise, enables us to determine the revenue in so far as that account embodies the sale of the service of the firm. It is noticeable that the accounts from which revenue can be computed are few in number as compared with the accounts from which expense can be computed. Almost all enterprises require the use of a long list of commodities and services as compared with the variety of commodities and services which they themselves produce.

The Expense and Revenue Statement, and the Balance Sheet

The Expense and Revenue Statement[3], is a summary presentation of all expenses and all revenues belonging to that period. That

[3] This statement is sometimes called the Income Sheet; the Profit and Loss statement; the Loss and Gain Statement, etc.

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is, it shows all the gross subtractions from and all the gross additions to proprietorship during the period, and its net result is the net loss or the net income. Such a statement is highly important in any business as it shows in condensed form the historical situation for the fiscal period. This sort of information is invaluable for the purposes of the operating management, the board of directors, and the owners.

This statement is made up at the time of the formal closing of the accounts. If the expense items are set up in separate accounts such as: Depreciation Expense, Fuel Expense, Labor Expense, etc., and the revenue items are carried to special accounts such as: Merchandise Revenue, Rent, etc., then the Expense and Revenue statement is a summary of these accounts, showing all expenses in one column and all items of revenue grouped in another column. If these separate accounts for expense and revenue are not opened, but all such items are carried to a general Expense and Revenue account, that account in itself is an Expense and Revenue statement. Either procedure or a combination of the two is legitimate; the importance of the single item of expense or revenue in any case should determine whether or not it be given a distinct account.

The balance sheet is the other important financial statement. If the inventories and appraisals are correct this statement gives an accurate presentation of the financial status of the business at the moment of closing the books. It is only at this time that the books represent the actual state of affairs. Many of the expenses are going on continuously and the day after closing the books will fail to represent the actual status of the business to some extent. The longer the interval between inventories the greater this discrepancy.

The balance sheet is sometimes called "a balance of balances." It is a summary of the ledger after the process of closing the accounts is complete. It shows in one column all the assets—property balances; in another column it shows the proprietorship and liabilities—equity balances.

A convenient method of making up the Expense and Revenue statement and the balance sheet after the trial balance has been taken and the inventories made is to prepare what is called a *seven column statement*. The following is an illustration:

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SEVEN COLUMN STATEMENT.

	Dr.	Cr.	Inventory	Assets	Liab.	Expenses	Revenue
Buildings	130,000.		129,350.	129,350.		650.	
Real Estate	60,000.		60,000.	60.000.			
Fur. & Fixtures	28,000.	2,000.	25,600.	25,600.		400.	
Merchandise	122,643.18	56,024.01	98,600.				31,980.83
Cash	57,989.43	31,764.39	26,225.04	26,225.04			
Accts. Rec.	24,946.87	13,429.76	11,017.11	11,017.11		500.	
Notes Rec.	8,900.	5,927.	2,973.	2,973.			
Labor	2,403.20		Cr. 130.		130.	2,533.20	
Fuel	600.		105.	105.		495.10	
Insurance	250.		225.	225.		25.	
Sales Disc.	3,113.					3,113.	
Pur. Disc.		2,916.14					2,916.14
Misc. Sup. & Ser.	892.17		Dr. 113.	113.		779.17	
Rent		400.					400.
Interest	200.07	63.17	C. 700 Dr. 75	75.	700.	761.90	
Cap. Stock		200,000.			200,000.		
Bonds		105,000.			105,000.		
Notes Pay.	6,000.	20,000.			14,000.		
Accounts Pay.	19,200.	27,613.55			8,413.55		
	465,138.02	465,138.02		354,283.15	328,243.55	9,257.37	35,296.97
Net Income					26,039.60	26,039.60	
				354,283.15	354,283.15	35,296.97	35,296.97

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This statement begins with the trial balance—which is a transcript of ledger debits and credits; adjusting the trial balance by means of the inventory figures gives us the data for the balance sheet and the expense and revenue statement. We shall examine the analysis and computation in detail. The first account shown in the trial balance is Buildings, with a debit balance of $130,000. The inventory figure shows that this kind of property is now worth $129,350, or in other words, the buildings have declined in value $650. The inventory figure is carried into the asset column of the balance sheet; the item representing depreciation of property is listed as an expense. In the case of Real Estate the inventory shows that the figure in the account itself gives the present value of the property. That is, in this account there has been no expiration of value, and hence no expense. The debit balance from the trial balance is carried as an asset to the balance sheet. Furniture and Fixtures is analyzed in the same way. The trial balance shows total debits of $28,000 and total credits of $2,000, or a net debit balance of $26,000. The inventory figure shows this property to be worth but $25,600. That is, there has been a decline in property value of $400, of which the books show no record. The inventory figure is carried to the asset side of the balance sheet; the item of depreciation is listed as an expense.

Merchandise is the account representing the kind of property embodying the major part of the proprietor's own product, which is in this case the service of retailing goods. Usually revenue and not expense is computed from an account representing the sale of the proprietor's service, even if the business is not realizing a net income. It would be possible, however, in the case of a very unfortunate enterprise, for the Merchandise account to show an expense instead of revenue. The explanation of the computation in the closing of Merchandise has already been made. The balance representing merchandise on hand is carried to the asset side of the balance sheet, the item of revenue is carried to the revenue column.

Cash shows an inventory just equal to the net debit balance as shown by the Cash account. Hence there is neither expense nor revenue involved in connection with this property item. If cash had been lost or stolen, however, an "extraordinary" expense would be computed from the Cash account. The amount of cash on hand is an asset and is carried to the balance sheet. Notes Receivable also has an inventory just equal to the debit balance shown by the ledger account, and hence shows no expense item. Accounts Receivable, however, is written down $500, because of estimated had

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debts. This leaves an asset balance of $10,017.11, and an item of $500 must be listed among the expenses.

The labor account shows an inventory of a different sort from those we have just been considering. The debit total in the labor account indicates the total amount of labor services purchased during the period and paid for. The credit or liability inventory shows that this entire amount of labor services has been consumed during the period and in addition labor services have been used to the amount of $130 and have not yet been paid for. Then the total amount of labor expense properly belonging in this period is the debit total of the labor account plus the inventory representing wages unpaid, or $2533.20. The item of $130 is a liability reseting a right of a certain kind against the property of the concern and is carried to the liability side of the balance sheet. If the inventory had shown wages prepaid, the situation would have been analogous to that of any of the accounts discussed showing an asset balance. Fuel and Insurance show asset inventories, and the distribution of items in the statements is evident.

The two accounts Purchase Discounts and Sales Discounts are very frequently met. The usual bill of purchase or sale contains alternative terms of settlement. If cash is paid within a certain specified time it is customary to allow a discount from the billing price. Now how should such commodities be entered on the books; at the discounted price or the billed price? The standard procedure is to enter merchandise, etc., at the undiscounted price; both purchases and sales. Then two offset accounts are necessary: Purchase Discounts, an offset or valuation account for goods purchased, showing the amount of such discounts actually taken by the firm on its purchases during the period; and Sales Discounts, showing the discounts actually taken by the firm's customers. One method of disposing of such discounts is to close them into Merchandise at the end of the period. Clearly the figure of revenue computed from the Merchandise account is inaccurate until this has been done; for Merchandise shows billing prices and actual prices will vary from these to the amount of discounts given and received by the firm. The final incidence of these discounts, then is to adjust the merchandise revenue figure; and this may be done either by closing into the Merchandise account or entering the discounts in the proper columns of the Expense and Revenue statement as was done here.

The account, Miscellaneous Supplies and Services, is used to represent small asset items; such as: stationery, postage, the service of freight and cartage, etc. These items are all property as pur-

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chased, and usually this account shows an asset balance at the end of the period. It is quite possible, however, for it to show a liability balance, which indicates that more of the commodities and services purchased under this head have been consumed this month than have been paid for. Frequently pure expense items, such as unexpected losses due to breakage and thefts, are thrown into this account. Theoretically this is bad practice, but no practical harm results, as the items are usually small; and, of course, the final incidence is in the proper place; viz. in the expense side of the Expense and Revenue statement. In the seven-column statement given above Miscellaneous Supplies and Services shows an asset inventory of $113; this leaves an expense of $779.17 to be carried to the expense column.

Rent is an account representing in this case sale of a service. Hence the $400 credit balance is an item of revenue and is carried to the revenue column. There might easily have been an inventory in connection with this account representing either rent unpaid or prepaid, or both; the analysis in such a case would be the same as in the Interest account.

Bonds, Notes Payable, and Accounts Payable represent outside equities. There is no inventory in connection with these items; only in the case of insolvency do these items depreciate. Hence the net balances as shown by the trial balance statement are carried directly to the liability side of the balance sheet. Capital Stock represents the proprietor's equity. This item is elastic; it increases if profits are made and decreases if the business has been operated at a loss. In practice, capital stock remains on the books at par; if proprietorship is greater than capital stock the excess is carried in surplus accounts, if less, the difference should be shown in accounts called Deficit or Discount on Stock.

Starting with a trial balance that "proves" the numerical computation involved in a seven-column statement is shown to be correct if the net income (or loss) added to the liability side of the balance sheet (the asset side in the case of a net loss) equates resources and liabilities. For the asset column shows all assets at the end of the period; the liability or equity column shows the present status of all equities with the exception of proprietorship. Proprietorship to date is not discovered until the result of the Expense and Revenue sheet is incorporated with the proprietorship from the preceding period. When this result is so incorporated property again equals equities.

The final process in closing the books is the distribution of net income (or loss) in the proprietorship accounts. If the entire

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profit were retained in the business the closing entry would be of this form:

Expense and Revenue	$26,039.60	
Surplus		$26,039.60

If $20,000 were distributed in the form of dividends, the entries would be[4]:

Expense and Revenue (or Surplus)	$20,000	
Dividends Declared		$20,000

and,

Dividends Declared	$20,000	
Cash		$20,000

This last step in closing shows clearly the relationship between proprietorship and expenses and revenues. It shows that expenses and revenues and accounts representing such amounts are properly described as subsidiary proprietorship items and accounts; for the net result of this group of items is incorporated into the proprietor's equity at the end of the period.

We have now covered the essentials of the process of keeping and closing the books according to the double-entry method, and of making the important statements. The complicated forms of modern financial records have not been shown or discussed; but the reader should be able at this point to grasp the fundamentals of the double-entry structure, and to recognize the general significance of the summary statements. A more extensive analysis of the income and balance sheets will be undertaken in later chapters.

[4] See Chap. V.

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V

THE PROPRIETARY ACCOUNTS

Ownership, broadly understood, is a complex fact comprising several elements of which the most important are: the bearing of risk, the taking of responsibility (control), and the furnishing of capital-service. These elements are more or less inseparable: e. g. there can be no risk without the furnishing of capital; nevertheless the modern specialization of securities is quite largely based upon these distinctions.

The line drawn in accounting between proprietorship and outside equities or liabilities corresponds to the distinction made in economics between the entrepreneur and the capitalist proper. The individual or interest that assumes the major element of risk in a business enterprise and takes the major share of final responsibility and control is the entrepreneur; the individual or interest that furnishes capital, but takes comparatively little risk, and has but slight direct control of financial policies and business operation is the capitalist proper. Similarly the equities which involve the large element of risk and control of operation form proprietorship; the other equities which carry less risk and less control are the outside equities or liabilities proper. The proprietor's equity acts as a buffer for all other equities in the enterprise; in case of financial disaster it is proprietorship that suffers first.

We have already frequently referred to proprietorship, and in the above paragraphs the general economic distinction between proprietorship and the other equities has been made. But in accounting practice proprietorship and the accounts representing this equity are quite definitely defined. It will be necessary at this point to discuss more fully the proprietary accounts and the important types of transactions affecting these accounts, especially from the standpoint of the leading types of business organization: (1) the single-proprietor enterprise; (2) the partnership; (3) the corporation. The details of the various legal phases of the different types of organization will be introduced only when necessary for the explanation of the accounts and the transactions.

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The Single-Proprietor Enterprise

The simplest form of proprietorship is found in the case where this equity is vested in a single person. Anyone who is producing for sale a commodity or service requiring for its production the outlay of capital might be called a proprietor. If the person directing production, however, owns no capital in the enterprise, then he is simply a manager or laborer selling his personal services.

Considering the business enterprise in this broad sense, there are doubtless more single-proprietor enterprises than of all other types combined. But this does not mean that this type of organization is the most important for the accountant. The newsboy on the street corner migh be thought of as a proprietor; but his business is so small that he has little need for records; all the details of his business, financial and otherwise, can be readily kept in mind. But the great majority of single-proprietor concerns are of sufficient financial importance to require accounting records; although many such enterprises do not use the complete double-entry method. Quite commonly, accounts are kept showing property and the outside equities or liabilities proper, but not proprietorship. We will only consider, however, the case where the complete double-entry method is followed.

Let us examine, then, the proprietary accounts and the transactions affecting such accounts in the case of a business where proproprietorship resides in a single individual[1]. We will suppose that

[1] It is in this form of organization that the distinction between proprietorship and liabilities proper can be most clearly drawn. The proprietor in this case is usually spoken of as the *owner,* (and is so regarded by the law); the liabilities represent the amount due to the "creditors" of the business. This is a more narrow conception of ownership than the one given at the beginning of this chapter, and it is not an entirely satisfactory view even in the case of the single-proprietor business; e. g., can we legitimately say that a person *owns* outright mortgaged property? Certainly it must be admitted that the propriety of the distinction made between proprietorship and liabilities proper on the ground that one equity represents ownership and that the other equities represent debts can be questioned even in the case of an organization of the type we are considering; and in the case of the corporation such a distinction becomes of very doubtful legitimacy. The view which looks upon all the equities as representing aspects of ownership is a more significant conception.

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A is a contractor, and that the following statement represents the financial status of his business July 1, 1916:

Assets.		Liabilities.[2]	
Apartments	$15,500	A, Capital Account	$16,000
Tools and Equipment	600	Mortgage	2,050
Automobile	700	Notes Payable	780
Rents due	1,200	Accounts Payable	3,490
Cash	4,320		
	$22,320		$22,320

The account entitled A, Capital Account, represents proprietorship in this statement. If A had just purchased this business as it stands above, the balance sheet statement given would represent the debits and credits of the opening entry.

The Expense and Revenue statement at the end of six months is as follows:

Expense.		Revenue.	
Labor	$1,200	Rents	$4,900
Depreciation	300	Miscellaneous Revenue	1,800
Auto Supplies	100		
Fuel	800		
Insurance	150		
Light	200		
Miscellaneous	400		
	$3,150		
Net Income	3 550		
	$6,700		$6,700

The net income (or increase in proprietorship) shown by this statement is $3550. The closing journal entry transferring this item to A's capital account from the Expense and Revenue account would be:

Expense and Revenue	$3550	
A, Capital Account		$3550

If, now, A decided to withdraw this profit the entry would be:

A, Capital Account	$3550	
Cash		$3550

[2] Hereafter in presenting a balance sheet we shall use the conventional terms, assets and liabilities. It must be remembered however, that the term liabilities includes both proprietorship and liabilities.

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Frequently A, Capital Account, is used to record only the permanent investment that it is expected will be left in the business. Another account is sometimes introduced called A, Drawing Account, which is credited with all items of income and debited with all withdrawals from the business.

This discussion shows the simplicity of the proprietary accounts and the transactions affecting these accounts in the case of a single-proprietor enterprise. The need for keeping accounts with proprietorship in such a case is not as great as in other forms of organization. If accounts are kept with all property items and all liabilities, proprietorship can be readily ascertained by subtracting liabilities from property. This is an indirect method, but would be feasible in the simple business. In such a case, however, the advantage of the complete double entry method in furnishing a test for numerical accuracy would be lost; further, unless subsidiary proprietorship accounts (or at least a general expense and revenue account) were kept, there would be little information in the records concerning the process whereby changes in the proprietor's equity had been brought about.

The Co-partnership Proprietary Accounts

In the case of a partnership the proprietorship accounts are more numerous than in a single-proprietor enterprise, but no important complexities arise. Suppose that proprietorship, in the balance sheet shown above, is represented by the capital accounts of two equal partners, A and B, instead of the single-proprietary account. (There may, of course, be any number of partners; and their investments may be of varying amounts). The Expense and Revenue statement at the end of six months is the same as that shown for the single-proprietor business; hence as far as expense and revenue accounts are concerned we would have exactly the same records in the single-proprietor concern as in the partnership. The entry closing this item of net income into the proprietary acocunts would differ only in that a greater number of accounts would be involved; thus:

Expense and Revenue	$3550	
A, Capital Account		$1775
B, Capital Account		1775

In distributing profits or making withdrawals the partner's capital account is debited and cash credited as in the single proprietor enterprise. There may be little regularity about

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the distribution of income, or withdrawals from investment, unless there is specific stipulation in regard to this point in the articles of co-partnership. This is one reason why the capital accounts of the partners frequently show such irregular balances. Usually the investments at the outset are equal or represent simple fractions of total proprietorship; the irregularity of withdrawals, however, soon disturbs this relation. This situation often makes the computation of a partner's share in income, or in assets at time of liquidation, somewhat cumbersome. This illustrates the need of drawing accounts to record current increases and decreases in the partners' equities.

When income is not divided among the partners in proportion to investments, interest is usually allowed on each partner's equity, and then a distribution of the residual income is made. Suppose that of the partners above mentioned, A is the only one actively interested in the business, while B is a "silent" partner, investing capital, assuming risk, but taking only slight interest in actual management. In this case the articles of co-partnership might stipulate that after each partner is allowed 6% on his investment, the balance of the income is to be divided two-thirds to A, and one-third to B. One way of recording this situation on the books would be to make two distinct distributions of income among the partners; thus:

Expense and Revenue	$480	
A, Drawing Account		$240
B, Drawing Account		240

which credits each partner with 6 months' interest on $8,000 at 6%; and,

Expense and Revenue	$3070	
A, Drawing Account		$2046.67
B, Drawing Account		1023.33

which distributes the balance of net income, two-thirds to A and one-third to B.

The transition from the partnership to the corporate form of organization furnishes accounting peculiarities. This situation will be discussed in the following section on corporate proprietorship.

Corporation Proprietary Accounts

The proprietor's equity in the modern corporation may be quite complex. There are two principal types of corporate securities, stocks and bonds. The economic distinction between entrepreneur

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and capitalist proper corresponds to the distinction between stockholder and bondholder. The stockholder assumes the larger element of risk in the enterprise and the larger element of control. The stockholder profits most if the business is very successful; he suffers first if the enterprise is disastrous. Hence, the stockholder is the proprietor, and his equity constitutes proprietorship; the bondholder's equity is classed among the liabilities proper.

Roughly speaking, proprietorship is represented by the capital stock and surplus (or deficit) accounts. This does not tell the whole story, however, as there are many kinds of capital stock. The most important distinction in stock is between common and preferred issues. This specialization of stocks is simply carrying the specialization of the elements of ownership one step further. The common stock is the more speculative—carrying more risk and frequently more control; the common stock is often given as a bonus with preferred stock or bonds, and in such a case its value depends purely upon the future earning power of the concern. The preferred stock may be preferred either as to income, or assets in case of liquidation, or both provisions may obtain. Usually the preferred carries a definite dividend rate. It is not our purpose to dwell in detail upon the distinctions between common and preferred stock and the different kinds of preferred. It is worth noting, however, as further justification for the use of the classification, *equities,* developed in Chapter II, that there are almost numberless varieties of preferred stocks. We have preferred issues that are "callable" under certain conditions; others that are "refundable" into other securities; and there are issues that are "participating," "cumulative," etc. In fact if we arranged all preferred stocks into a series according to their similarity to common stock we would find at one extreme issues of practically the same character as common stock, and at the other extreme issues so conservative and hedged about with safety devices as to hardly be distinguishable from some types of bonds. That is, it should be realized that the distinction made between stock-holder and bondholder on the basis of proprietorship and liabilities is somewhat arbitrary. The justification for the distinction, however, lies in the fact that no business can become insolvent because it does not pay the claims of stockholders, whereas if bond interest or principal is defaulted, bankruptcy ensues.

It is evident that the need for complete proprietary accounts in the case of the corporation is imperative. It is not enough to be able to ascertain total proprietorship at any moment by subtracting outside equities from total property; specific accounts must

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be kept which show accurately the equities of the different classes of stockholders in order that the rights of all may be preserved. Further, the preservation of the integrity of the figure, net income, and the keeping of records and accounts which show fully the process whereby this figure has been attained, is of vital importance where several interests are concerned.

An important general characteristic of corporate proprietary accounts lies in the fact that proprietorship, under this form of organization, does not depend upon specific individuals. The personnel of the stockholders may change indefinitely (and does in the case of securities actively traded in) without affecting the proprietary accounts. A corporation tends to be perpetual, regardless of who its stockholders may be, and this fact lends a decidedly impersonal character to the proprietorship accounts. In this respect the corporation differs sharply from the co-partnership, for any change in the personnel of the partners means the dissolution of the old partnership and a change in the proprietary accounts.

The accounts representing proprietorship are not affected by ordinary transactions of purchase and sale, but only at times of organization, reorganization, merger, dissolution, etc.; and by the process of distributing net income, subdividing the surplus, refunding securities, and the like.

We shall discuss these accounts, and the transactions which affect them, under three general heads: organization entries; changes in the equities; surplus and its subdivisions.

Organization Entries

The organization of a corporation frequently represents a change from the partnership form. We shall first discuss this case. The balance sheet of a partnership shows this condition:

Assets.		Liabilities.	
Plant	$50,000	A, Capital Account	$22,000
Machinery	10,000	B, Capital Account	38,000
Supplies	2,500	Notes Payable	6,500
Patents	2,700	Accounts Payable	2,600
Accounts Receivable	1,800		
Notes Receivable	600		
Cash	1,500		
	$69,100		$69,100

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The A. B. Co. is formed for the purpose of taking over the old partnership and expanding the business. According to the terms of the purchase, all the assets of the partnership are to be taken over at their book value, and all the liabilities are to be assumed by the new concern. Capital stock is authorized for $100,000, par $100. The partners are to receive $75,000 in stock for their equities in the partnership. We will suppose that this agreement is consummated. What would be the closing entries on the books of the partnership?

This agreement involves the recognition of *goodwill*. The partners' equities stand on the books at $60,000. They are to receive $75,000 in the stock of the new enterprise. This situation almost invariably arises when a partnership is taken over by a corporation. The goodwill may, of course, be entirely legitimate, due to the trade name, selling organization, etc.; on the other hand it is very frequently illegitimate.[8]

Then a preliminary entry will be necessary on the books of the partnership to recognize this goodwill, and credit it to the partners in proportion to their investment; thus:

Goodwill	$15,000	
A, Capital Account		$5,500
B, Capital Account		9,500

All the assets, including the goodwill, are now transferred to the A. B. Co., and the liabilities are assumed by that company. The partners receive $75,000 capital stock. A simple journalization of this transaction would be:

Capital Stock (of A. B. Co.)	$75,000	
Notes payable	6,500	
Accounts Payable	2,600	
Plant		$50,000
Machinery		10,000
Supplies		2,500
Patents		2,700
Accounts Receivable		1,800
Notes Receivable		600
Cash		1,500
Goodwill		15,000

[8] See Chapter X for a discussion of goodwill.

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The partnership balance sheet would now show this condition:

Capital Stock (A. B. Co.)	$75,000	A, Capital Account	$27,500
		B, Capital Account	47,500
	$75,000		$75,000

The final step in liquidating the partnership will be the division of the capital stock received between the partners in proportion to their investments, and the closing of the accounts. In this case the partners' capital accounts are such that the stock can be divided in exact proportion to the balances shown by these accounts. Since a share of stock cannot be divided, it frequently happens that one partner will have to take an extra share, paying the difference in cash. In this case A would receive 275 shares, and B, 475 shares; and the closing entry would be:

A, Capital Account	$27,500	
B, Capital Account	47,000	
Capital Stock (A. B. Co.)		$75,000

A simple form of the opening entries on the books of the A. B. Co. would be:

Plant	$50,000	
Machinery	10,000	
Supplies	2,500	
Patents	2,700	
Accounts Receivable	1,800	
Notes Receivable	600	
Cash	1,500	
Goodwill	15,000	
Capital Stock		$75,000
Notes Payable		6,500
Accounts Payable		2,600

If the balance of the stock authorized were now sold for cash, this would be journalized:

Cash	$25,000	
Capital Stock		$25,000

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A balance sheet of the corporation at this point would show this condition:

Assets.		Liabilities.	
Plant	$ 50,000	Capital Stock	$100,000
Machinery	10,000	Notes Payable	6,500
Supplies	2,500	Accounts Payable	2,600
Patents	2,700		
Accounts Receivable	1,800		
Notes Receivable	600		
Cash	26,500		
Goodwill	15,000		
	$109,100		$109,100

A comparison of this balance sheet and the original partnership statement shows that the important change that has occurred is in the proprietary accounts. The property accounts stand as they did before (except for the introduction of Goodwill and the increase in Cash), only now they are on the ledger of the corporation. The outside equity accounts show no change; but in place of the partners' capital accounts, we now have Capital Stock representing proprietorship. This illustrates the fact that the type of organization affects the character of the accounting records primarily in the equity accounts.

The opening entries in the case of the original organization of a corporation are usually much more detailed than shown above. The Blank Company is incorporated under the laws of Michigan, July 1, 1916. The company plans to do a general manufacturing business. The authorized capital is $175,000, divided into 1,000 shares common, par $100, and 750 shares preferred, par $100. At the time of incorporation $50,000 of common stock is subscribed, and $25,000 of preferred. There are various methods of making the journal entries to record this situation. The entries might have this form:

Subscriptions (Common)	$50,000	
Subscriptions (Preferred)	25,000	
Stock Subscribed (Common)		$50,000
Stock Subscribed (Preferred)		25,000

A subscription for capital stock is of the nature of a promissory note, and hence is an asset of the corporation. Stock Subscribed represents the promise of the corporation to issue the stock when the subscriptions are paid.

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At the time the subscriptions are paid, the journal entry would be:

Cash	$75,000	
Subscriptions (Common)		$50,000
Subscriptions (Preferred)		25,000

After the subscriptions have been paid in cash the corporation is required to deliver the stock. The following entry would cover this transaction:

Stock Subscribed (Common)	$50,000	
Stock Subscribed (Preferred)	25,000	
Capital Stock (Common)		$50,000
Capital Stock (Preferred)		25,000

The balance of stock authorized (both common and preferred) is now sold immediately for cash. The entry would be:

Cash	$100,000	
Capital Stock (Common)		$50,000
Capital Stock (Preferred)		50,000

If the balance of stock authorized had been subscribed, and an interval had elapsed before the subscriptions were paid, then the additional entries involving Subscriptions and Stock Subscribed would be necessary. This is practically always the case.

There is no particular advantage to be gained from opening accounts with unissued stock and stock authorized. This information is contained in the minutes of the directors' meetings and in the articles of incorporation. It is sufficient for practical purposes if the first entries in the books proper are made when subscriptions are received, and cover only the amount of stock subscribed. A great many companies always show stock outstanding on the balance sheet rather than stock amortized. The carrying of unissued stock on the balance sheet among the assets is thus avoided. The term Treasury Stock is frequently used with this meaning. This is unfortunate terminology; Treasury Stock should be applied only to capital stock once issued for value received, and bought back by the corporation. Unissued stock simply represents the authorization of the directors; it may never be issued, and in such a case is a fact of little importance.

The balance sheet of the Blank Company after the consum-

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mation of the foregoing transactions would show the following condition:

Cash	$175,000	Capital Stock (Common)	$100,000
		Capital Stock (Preferred)	75,000
	$175,000		$175,000

Let us modify the above illustration to show a somewhat different situation. We will suppose that a Mr. Blank, who is a prominent figure in the organization of the Blank Company, has subscribed for $75,000 of common stock and $25,000 of preferred, for which he is going to pay by turning over to the company a factory which he owns. It is further agreed that he is to donate back to the company $50,000 of common stock which is to be sold to provide working capital. The purpose of such an agreement is to make possible the use of the phrase, "fully paid and non-assessable," on the stock certificates. A stockholder is usually liable for the par value of his stock. Thus non-assessable stock sells more easily to the investing public than the assessable issues. In most cases the law can be complied with, and the stock made legally fully paid, by such a formal transaction as the one we are considering. At the point of the actual turning over of the property the transaction would be journalized on the books of the corporation as follows:

Factory	$100,000	
Capital Stock (Common)		$75,000
Capital Stock (preferred)		25,000

When Mr. Blank donates the stock to the corporation the entry would be:

Donated Stock	$50,000	
Reserve for Donated Stock		$50,000

Treasury Stock is sometimes used here, but Donated Stock is better. It is very unlikely that Blank's factory is worth more than $50,000; and if such is the case the stock returned to the corporation is not an asset. This is a formal transaction for complying with rather lax legal requirements.

The donated stock is now sold for cash at $75 per share. The journal entry should be:

Cash	$37,500	
Discount on Donated Stock	12,500	
Donated Stock		$50,000

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If the factory is worth but $50,000, the Reserve for Donated Stock should be written off against the Factory account. The entry would be the following:

Reserve for Donated Stock	$50,000	
Factory		$50,000

A balance sheet covering simply these transactions with Mr. Blank would now show the following condition:

Factory	$ 50,000	Capital Stock (Common) ..	$ 75,000
Discount on Donated Stock..	12,500	Capital Stock (Preferred)..	25,000
Cash	37,500		
	$100,000		$100,000

If we assume the factory to be really worth $100,000 and that Mr. Blank is willing to make this arrangement because of his interest in the success of the enterprise, this virtually means that he pays a premium of $37,500 for his stock. This would modify the above entries. Instead of using the term, Reserve for Donated Stock it would be proper to use Donated Surplus. In this case Discount on Donated Stock should be closed against Donated Surplus; thus:

Donated Surplus	$12,500	
Discount on Donated Stock ...		$12,500

The factory would be allowed to remain at $100,000. The resulting balance sheet would be:

Factory	$100,000	Capital Stock (Common)...	$ 75,000
Cash	27,500	Capital Stock (Preferred) ..	25,000
		Donated Surplus	37,500
	$137,500		$137,500

Thus far we have not discussed the records which take care of the relation between the individual subscriber and stockholder, and the corporation. A subscription book is kept in which are recorded the details in connection with each subscription. If the subscriptions are to be paid in installments a separate installment book is sometimes used. Finally a stock ledger is necessary which contains an account entitled Capital Stock, and an account with each stockholder. Capital Stock is debited with the total stock outstanding, and each stockholder is credited with the amount of stock he holds.

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When there is a sale of stock, the seller is debited and the buyer credited. Corporations whose stock is dealt in actively employ a transfer agent to make all actual transfers. The personal records with the subscribers and stockholders are entirely outside the financial books proper.

Very frequently in corporation organization the par value of stocks issued exceeds the value of all property acquired. It is common practice to write up the property to the point where the securities are apparently validated. This is sometimes done by using, Real Estate, Patents, Copyrights, etc.—or some similar caption—on the balance sheet. This is decidedly bad practice. If goodwill exists, it is proper to put this item on the books, and it should be given a specific account and should appear in the balance sheet at the actual amount carried in that account. But the use of general balance sheet captions and the indiscriminate writing up of property to make an apparent validation of stocks issued should be avoided. The item Discount on Stock should appear frankly on the balance sheet as an offset to stocks entered at par but issued at a discount. Both Discount on Stock and Deficit are offset or valuation proprietorship accounts. It is desirable, however, to distinguish between the two, and restrict the use of Discount on Stock specifically to cases where the par value of stock at the time of issue exceeds the property value acquired, and to use Deficit to indicate an offset to proprietorship caused by losses in business operation.

Surplus appear at the time of organization will be discussed in connection with the general surplus accounts.

Surplus and Its Subdivisions

It was stated early in this chapter that proprietorship is represented in the corporation by the capital stock and surplus (or deficit) accounts. That is, Surplus represents the excess of proprietorship over the capital stock accounts, and Deficit—or negative surplus—represents the amount by which Capital Stock exceeds proprietorship. Profit and Loss, Undivided Profits and Surplus are all used synonomously; but Surplus is probably the most desirable term.

There are two kinds of surplus: (1) that which originates at the time of organization and in connection with the sale of securities; (2) accumulated profits.

The first type is of comparatively rare occurrence. We have already discussed one possibility, the donated surplus. The other important case is where stock is issued at a premium. This is

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rather unusual, but happens occasionally, especially in banking corporations. Securities are always maintained on the books at par; then if a bank or trust company issues $100,000 of stock at 115, a journal entry like the following is necessary:

Cash	$115,000	
Capital Stock		$100,000
Capital Surplus		15,000

Such a surplus account should have some distinctive title such as the one used here. In railroad accounting the Interstate Commerce Commission prescribes the use of the accounts Premium on Stock, and Discount on Stock for the recording of capital surplus and deficit. This is a commendable practice. One source of confusion in accounting is the loose and non-standardized nomenclature. The names of accounts should give at least a reasonable clue to what they contain even at the inconvenience of using one or two extra words.

The question as to what should be done with accounts representing an organization deficit or a capital surplus is important. It is usually conceded to be good practice to close Discount on Stock against the annual or accumulated profits. In such a case we would have a journal entry something like this:

Annual Surplus	$10,000	
Discount on Stock		$10,000

There is must to be said, however, in favor of considering Discount on Stock and Premium on Stock as permanent accounts to be left on the books. The original investment in neither case equals the par value of the capital stock. And it seems highly desirable to have a group of proprietary accounts which record that original investment. It is perfectly proper to reinvest profits, but if Discount on Stock is closed against income, the records will not show either the original investment or the actual amount of income retained in the business. If permanent accounts are kept showing the amount of discount or premium as the case may be, and distinct surplus accounts are used to record accumulated profits, then the records at all times show the original proprietorship, and the amount by which that proprietorship has been increased through the reinvesting of profits in the enterprise.

As indicated above, it is desirable to restrict the term surplus to its common usage, viz. accumulated profits. If surplus is used

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to express any other fact, qualifying terms should be added, so that there can be no doubt as to the meaning intended.

Surplus, then, is the resultant of net income balances which have not been distributed as dividends. If the Expense and Revenue sheet shows net income of $20,000, for example, and the directors order a dividend posted of $10,000, and the balance is carried to Surplus, we would have the following entries[4]:

Expense and Revenue	$10,000	
Dividends Declared		$10,000
Expense and Revenue	$10,000	
Surplus		$10,000

Thus it is evident that the final incidence of all net income balances from the expense and revenue accounts of the business is in surplus and dividend accounts; and all net loss balances are carried to deficit or negative surplus accounts. The general surplus and deficit accounts thus originate as summary accounts for all balances from subsidiary proprietorship accounts that are not distributed as dividends.

Having discussed the origin and general nature of surplus, we shall now consider the subdivisions of surplus and the process of setting up these accounts. A large number of the resolutions of the board of directors affect the surplus accounts. The process of subdividing surplus is sometimes spoken of as making appropriations from surplus. In itself it is a purely formal process and can go on indefinitely without affecting the property accounts or resulting in any actual transactions. Making appropriations from surplus is simply the putting of different labels on portions of surplus. This formal process of dividing the general surplus is continually being confused with the setting up of assets in special funds. We shall consider a number of important Illustrations of surplus appropriations.

1. Dividends are frequently appropriated from Surplus. These may be either cash or stock dividends. Surplus represents accumulated profits, and hence is available for dividends at the option of the directors unless it has been appropriated for specific purposes. The two types of dividends are entirely distinct in character.

[4] In Chapter XI the question of dividing what we have thus far called the Expense and Revenue statement into several parts, will be discussed. No doubt it is desirable to charge dividends declared and items carried to surplus against a distinctive part of the income sheet.

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The entries covering a cash dividend declared from Surplus would be as follows:

Surplus	$10,000	
Dividend Declared		$10,000
Dividend Declared	$10,000	
Cash		$10,000

The first entry involves a withdrawal of $10,000 from Surplus, and the setting up of the same amount in a special account. This dividend account represents a part of the general surplus. It is true it must be paid like any debt, but it is a misnomer to call it a liability. It belongs to the proprietor and hence is clearly part of total proprietorship. The second entry covers the actual payment of cash and represents a transaction of an entirely different type.

The payment of a stock dividend involves no withdrawal of cash. It is a purely formal process. The directors decide to issue stock certificates covering all or part of the accumulated surplus. This is simply a formal recognition of their intention to allow this surplus to remain permanently as investment. Once represented by stock certificates, it is no longer available for other appropriations. The journal entry would be the following:

Surplus	$50,000	
Capital Stock		$50,000

2. An important illustration of a type of surplus account is found where the bond contract carries a sinking fund provision or where the directors decide of their own volition to adopt the sinking fund method. We will suppose that the bond contract in the case of a corporation having outstanding $1,000,000 of twenty-year bonds requires that each year until the bonds mature an appropriation of $50,000 be made from Net Income or Surplus under the title of Sinking Fund Reserve. (Various names are used; such as Reserve for Sinking Fund; Sinking Fund; etc. Sinking Fund Surplus would be a good term.) The reason for such a requirement is that the bondholder is better protected if profits are being retained in the business. Let us examine the entries setting up such a surplus. The appropriation might be made directly from Annual Surplus; as:

Annual Surplus	$50,000	
Sinking Fund Reserve		$50,000

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or Annual Surplus might first be carried to Surplus, and the appropriation made from the later account; as:

Annual Surplus	$50,000	
Surplus		$50,000

and,

Surplus	$50,000	
Sinking Fund Reserve		$50,000

These appropriations from income or surplus are entirely independent of the property accounts. And yet there is very common confusion on this point. Doubtless the fact that the directors sometimes decide to set up actual funds concurrently with these appropriations is partly the reason for this confusion. But the point should be emphasized that there is no *necessary* connection betwen the appropriating of surplus or income and the setting up of special funds. The former process insures the retaining of profits in the business which might otherwise be paid in dividends, but it does not affect any specific asset account. The latter procedure involves simply a transposition of assets; for example:

Sinking Fund Assets	$50,000	
Cash		$50,000

Sinking Fund Reserve is not affected by the repayment of the bonds. This can be clearly shown by an examination of the balance sheets. We will assume the balance sheet at the date the bonds were issued to be:

Property	$2,000,000	Capital Stock	$1,000,000
		Bonds	1,000,000
	$2,000,000		$2,000,000

At the date the bonds mature the balance sheet stands as follows:

Property	$3,000,000	Capital Stock	$1,000,000
		Bonds	1,000,000
		Sinking Fund Reserve	1,000,000
	$3,000,000		$3,000,000

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The following entry would be made when the bonds are paid:

Bonds	$1,000,000	
Cash		$1,000,000

Sinking Fund Reserve can now be transferred to surplus:

Sinking Fund Reserve	$1,000,000	
Surplus		$1,000,000

And the resulting balance sheet would show the following condition:

Property	$2,000,000	Capital Stock	$1,000,000
		Surplus	1,000,000
	$2,000,000		$2,000,000

The final result shows simply that $1,000,000 in profits has been retained in the business during twenty years.

Inexact terminology is largely responsible for the tendency to confuse property transactions and the formal process of subdividing general surplus. The term "Sinking Fund" is frequently found in practice on both sides of the balance sheet. On the left-hand side it represents assets, on the opposite side it represents part of surplus. Sinking Fund Assets is the proper name for the property account; and Sinking Fund Reserve for the proprietary equity account.

3. A peculiar case of surplus arises when contingencies which have been anticipated do not materialize. For example, a shipping company carries its own fire insurance by charging against revenue each year the amount which experience has shown to be the average fire loss in this type of business, and crediting this amount to an account entitled Reserve for Fire Insurance; thus:

Expense and Revenue	$10,000	
Reserve for Fire Insurance		$10,000

If safety devices and more efficient management cut down the fire loss a part of this valuation reserve may become a real sur-

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plus, and in such a case could properly be transferred to the surplus account; thus:

Reserve for Fire Insurance[5]	$5,000	
Surplus		$5,000

In certain cases, a management, desiring to present an ultra-conservative showing, will transfer a portion of Surplus to an account called Reserve for Contingencies or some similar name, to cover possible but unlikely losses. Such a reserve is part of the general surplus and should be so considered in computing total proprietorship. For obviously, the proprietor's entire equity is subject to loss under unusual conditions.

4. In railroad accounting a common illustration of a surplus appropriation is Reserve for Addition and Betterments. The journal entry setting up such an account is something like the following:

Surplus	$50,000	
Reserve for Additions and Betterments		$50,000

Such an appropriation is simply a formal recognition of the fact that income retained in the business is to be used for a particular purpose.

Many further illustrations might be given of particular surplus accounts. The cases described, however, are among the most important. Some of the problems raised we shall have occasion to deal with in later chapters. It should be recognized at this point that an important part of the accounting entries are of the formal sort, concerned with changes in the current proprietary accounts and made for the most part upon authorizations by the board of directors.

Changes in the Equities

The proprietary accounts are frequently affected by changes in the equities of a different kind from any thus far described. For example, a fairly common financial operation is the exchange of bonds for stock (the reverse operation is rare). Many issues of bonds give the holder the privilege of exchanging his securities

[5]Reserve for Fire Insurance, Reserve for Bad Debts, Reserve for Depreciation, etc., are ordinarily pure offset or valuation accounts and must not be confused with Surplus.

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for stock under certain conditions. This is particularly common in the case of mining corporation bond issues. When such an exchange occurs, the Bond account is debited and Capital Stock credited. A case in which such a transaction occurs on a large scale is in reorganization. At such a time whole issues of bonds are frequently exchanged for stock. This is further illustration of the uncertainty of the proprietor-debtor classification of equities as a fundamental consideration. At any rate the debtor in receiverships and reorganization often passes into the proprietor category.

Increases and decreases of capital stock in connection with mergers, business expansion, dissolutions, etc., are of common occurrence under modern financial conditions. Such transactions are often very complex; but no important peculiarities in accounting analysis that we have not already discussed arise in connection with such cases.

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VI

THE DETERMINATION OF PROFITS AND PROPRIETORSHIP.

In the discussion of the closing and interpretation of accounts the general problem of ascertaining profits was raised. It was shown that the trial balance—a summary of the open ledger accounts—does not furnish the data which will show either the present financial status of the business, or the expenses and revenues of the past accounting period. Inventories and appraisals are necessary in nearly every case to determine the property balance on hand and the amount of property value that has expired since the last statements were prepared. But thus far only the formal accounting process has been discussed. In the present chapter the more important questions of analysis that arise in the determination of net income and proprietorship will be considered.

A broad definition of income would make the term include all sums available for distribution to security holders of all classes. From this standpoint interest payments to bondholders are distributions of income rather than charges against revenue. We will defer the discussion of the subdivision of the general income statement to Chapter XI, however; and in this chapter we shall continue to think of the income sheet as a statement of expenses and revenues for the period, showing the residual net income (or loss) which represents the current addition (or decrease) in proprietorship.[1]

[1] The term net income or profit as ordinarily used is not synonymous with the profit of economic theory. Even in the case of the corporation, the stockholder's dividend represents at least interest on the capital furnished as well as pure profit for the risk and responsibility assumed. And in partnerships and single-proprietor enterprises wages often form a large part of profits so-called. The analysis of the elements in what we might term gross profits is very frequently made by the entrepreneur, however, and this analysis is occasionally recognized in the records. For the purposes of financial accounting there is no need of separating net income into its economic elements.

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Receipts and Disbursements vs. Expense and Revenue.

The Expense and Revenue statement should exactly represent the situation for a particular accounting period. That is, this statement should show revenues and expenses *accrued* in the fiscal period just past. All commodities and services *consumed* in the period constitute the total expense; all revenues *earned* during the period constitute total revenue. Thus a distinction should be sharply drawn between statements of cash receipts and expenditures, and of expenses and revenues.

This point needs further elaboration, for frequently in actual practice the distinction is not recognized. Particularly in municipal enterprises is the treasurer's report accepted in lieu of an Expense and Revenue statement. In most cities the statement from which the budget for the ensuing fiscal period is prepared is that of receipts and disbursements. This is merely a statement of cash received and paid out during the year. It records the stewardship of the officers in regard to one kind of property—cash. This is clearly not the same information as that shown by an income sheet. Cash disbursements and expenses are not synonymous terms. Payments are often made for permanent improvements which are not expenses. Disbursements may be made in one year to cover the expenses of a previous year. Similarly, expenses of a period often do not appear among the current disbursements, but will be paid in later periods. Further, certain expenses may not involve expenditure for years, if ever. An example of such an expense is depreciation. Depreciation may be regularly charged to operating expense and replacements may not occur for a long period. The situation in regard to revenue earned as compared with cash receipts is analogous. An illustration will perhaps make the distinction between these different kinds of information entirely clear.

The city of Imlay owns its water plant. At the end of the year 1912 the city treasurer's report shows the following:

Receipts.

Cash on hand Jan. 1, 1912		$21,400
Assessed Rates	$33,967	
Metered Water	14,722	
Mason Work	836	
Metered Rentals	170	
Miscellaneous	71	
Bank Loan	1,000	
Sale of Abandoned Property	5,500	56,266
Total Receipts for the year	$56,266	$77,666

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Disbursements

Operation:		
Pumping Station Expense	$ 6,402	
Fuel	5,061	
Office and Distribution Expense	10,072	
Rebates and Stoppages	605	
Maintenance:		
Repairs to Distribution	607	
Repairs to Pumping Station	644	
Repairs to Meters	581	
Interest on Bonds	15,000	
Sinking Fund Assets	15,000	
New Extension	18,000	
Insurance	414	
Total Disbursements for the year	$72,386	72,386
Cash on hand Dec. 31, 1912		$ 5,280

On the basis of the above figures the treasurer reports that the water plant has been operated at a deficit for the year of $16,120, and recommends that the water rates be raised.

Let us examine the items in this statement in order to determine whether or not the treasurer's recommendaion is justified. All of the items shown among the receipts of the current year appear to be from revenue sources with two exceptions. The amount realized from the sale of abandoned property is evidently not a revenue; it represents a property exchange with very likely a large element of expense involved. And the $1,000 borrowed from the bank is not a revenue; revenue cannot be earned by borrowing. Among the disbursements Sinking Fund Assets and New Extension are not expenses. Sinking Fund Assets (as was explained in Chapter V) is not an expense account, but represents a special fund of assets set aside to redeem bonds. Revenue cannot be earned by incurring debts, neither is expense incurred by paying debts. Further, New Extension represents quite evidently an expenditure for capital improvements and should not be included among the expense items.

The following represents the Expense and Revenue statement for the year constructed in accordance with the above suggestions.

Revenue.

Assessed Rates	$33,967	
Metered Water	14,722	
Mason Work	836	
Meter Rentals	170	
Miscellaneous	71	
Total	$49,766	$49,766

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Expense.

Operation:		
Pumping Station Expense	$ 6,402	
Fuel	5,061	
Office and Distribution Expense	10,072	
Rebates and Stoppages	605	
Maintenance:		
Repairs to Distribution	607	
Repairs to Pumping Station	644	
Repairs to Meters	581	
Interest on Bonds	15,000	
Insurance	414	
Total	$39,386	$39,386
Net Income		$10,380

This statement shows a net income for the year of $10,380, as compared with a deficit shown by the treasurer's report of $16,120.

The above Expense and Revenue statement, however, is probably inaccurate. Depreciation for the year is not taken into consideration. Further, the statement of revenue assumes that revenue earned during the fiscal period coincides with cash receipts from revenue sources. This is a very unlikely situation; doubtless some of these payments represent revenue earned in the preceding period, and do not include all the revenue accrued in the current period. No doubt an analogous situation exists in regard to the expense items. This emphasizes the need for distinct expense and revenue records. The success or failure of operation for a given fiscal period can only be shown by a statement of revenue earned and expense accrued in that period. The excess of cash received over cash disbursed for the year, or vice-versa, gives little clue as to net income or loss for the period.

Organization and Construction

In the organization and construction period the question arises as to whether certain expenditures should be considered as capital outlay and part of the cost of the property, or as organization expense, an immediate offset to proprietorship. Some of the most difficult problems of accounting analysis arise at this point. In the following discussion it will not be possible to cover completely all of these problems. Sufficient illustrations will be presented, however to suggest the nature and scope of the questions involved; and as far as possible the principles according to which these questions must be answered will be developed.

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It is frequently urged that certain organization expenditures which do not result in physical property should be considered as expense and not investment. Examples of such expenditures are: lawyer's fees, clerical incorporation expenditures, commissions paid to underwriters, etc. There is little force in this contention. All legitimate expenditures which must be made to bring about the successful organization of the enterprise can properly be considered as cost of property or investment.

As to whether an expenditure results in an addition to *physical* property or not is a point of little significance. Even the actual expenditure for construction contains other elements than the cost of physical goods. Both labor and material costs are involved in any item of physical property. And material cost itself can be resolved again into labor and material cost. The cost of the original material elements that go to make up the completed property may be a very small fraction of the total cost. Expenditures for commodities and services are made concurrently during the entire construction period. One expenditure is just as must investment as the other. Further, the engineering costs are no more properly capital expenditures than are the costs of financiering. The building of a railroad, for example, could never be accomplished by the construction engineer alone; the capital of the investor must be drawn into the task, and it may be necessary to interest hundreds or thousands of individual capitalists.

It might be urged that services, like those furnished by the underwriter, do not have definite market prices, and hence expenditures for such services are susceptible to financial juggling and manipulation. It is true that commissions are frequently illegitimate; but there is nearly as much danger of the exploitation of the investor in engineering expenditures as in the payments made for financiering. The contractor's "rake-off" is a too-familiar fact.

The question as to the proper analysis of interest payments made during the construction period is sufficiently important to receive separate consideration. During the construction period interest will accrue on the capital furnished, and several interest payments may be actually made before the operation begins. How should such charges be considered? In conformity with the above analysis interest is the cost of a necessary service; hence it should be included in the cost of property. The case seems clear enough as far as interest on bonds and other outside equities is concerned; the real difficulty arises in connection with the investment of the stockholder—the proprietor. Should the proprietor be allowed interest on his investment during the construction period; that is, should

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a reasonable return on the proprietor's equity during the construction interval be charged to the cost of the property?

To answer this question we must refer to the economic distinction made in Chapter V between proprietorship and liabilities. The proprietor assumes the larger element of risk and his return is called *profit* (interest and pure profit.) Now in view of the burden assumed by the stockholder, his attitude toward his investment differs from that of the bondholder. The bondholder expects to receive a definite return at certain specified times; this return is constant; it neither increases nor decreases. The stockholder, on the other hand, does not look for a return on his investment in the construction period. For the interest lost and the risk assumed during this period he expects to be compensated in later prosperous years. Then in view of the nature of the proprietor's equity, is it reasonable to charge a return on this equity during construction to the cost of property? It would seem as if this were in the nature of adding forecasted profit to the value of the property. No expenditure takes place during construction for this cause, and the stockholder is willing to make his investment with the expectation of rewards later. Hence, taking the view point that the property should be charged only with the cost of all services and commodities necessary to inaugurate the enterprise, there would seem to be no legitimate excuse for considering a return on proprietorship during construction as a cost of property[2].

The accounting entries in the case of expenditures during construction such as interest payments, are very simple. The journal entry at the time of payment would be:

Interest	$10,000	
Cash		$10,000

The interest account, however, will not be closed into an expense account, and thus finally into the proprietary accounts, but at the end of the construction period will be charged to the various prop-

[2] This does not mean that it is illegitimate to allow "going value" (See Chapter X) in the case of public utilities. If the rates prescribed by law are too low to permit the remuneration of the stockholders for the period of waiting, then allowing the legal rate to be earned on a larger property value is one way of avoiding injustice. In the case of competitive enterprise, however, this situation would not arise.

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erty accounts; such as: Buildings, Machinery, etc., on some arbitrary basis, thus:

Buildings	$2,000	
Machinery	2,000	
Interest		$4,000

It would be entirely proper to leave Interest on the books as a permanent property account, but it is of practical convenience in the later treatment of the accounts to use Interest as a clearing account during construction and later to distribute the balance in this account among the tangible property accounts.

Another important problem concerns the treatment of depreciation during construction. Whenever the construction period is of considerable length, physical deterioration of property inevitably takes place. The question arises: Is this deterioration to be considered as an expiration of property value—depreciation; and should there be charges to expense and deductions from the cost of the property to represent this fact? If we are to be consistent with the view that all necessary expenditures for commodities and services to bring about the construction of the enterprise are costs of property and hence investment, then a negative answer to the above questions must be given. One or two analogies may serve to justify this conclusion. In constructing buildings and other structures much material is consumed which is not embodied in the final physical result. Consider, for example, the "forms" necessary in concrete work. This material may be later taken down and discarded, but its cost is considered as part of the cost of the finished structure. Again, in working up the building material, the workmen are obliged to waste a considerable amount. Raw materials are not of proper size and shape and some waste is unavoidable. Further, the costs of the tools and machines that are depreciated or worn out in construction work are considered as part of the cost of the property. No one questions any of these cases; then why should the wear and tear of the permanent parts of the structure during the construction period be deducted from the cost of the property and considered as an expense? The partial decay of physical property which is embodied in the final result is one of the costs of construction akin to the decay of property necessary to the result, but not represented in the physical constitution of that result.

Thus far it has been assumed that no question arises as to the definition of the construction period; but as a matter of fact this is often a serious problem. If the enterprise is forced to lan-

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guish for long intervals because of the lack of capital; or if the actual construction work is carried on inefficiently, it would be decidedly improper to capitalize the costs of this delay and inefficiency. Or if unusual accidents occur and retard the construction work, it would seem unreasonable to load the value of the property with such costs.

The determination of the construction period presents probably the greatest difficulty in railroad building. The construction of a railroad several hundred miles long may require a number of years. In determining what is a proper construction period in any case, the whole situation must be cannvassed. The topographical nature of the country through which the railroad passes in as important factor. All legitimate obstacles to speedy construction must be taken into consideration. It may be that part of the road will be turned over for operation before the entire line is completed. In such a case interest and similar charges made from this time on covering the finished portion of the property cannot be considered as property costs. Or if such charges are considered as costs up to the time that the entire property is ready for operation, then all revenue earned during this period must be credited to the cost of property[8].

The construction period is sometimes confused with the "developmental" period. The following case illustrates this confusion. A railroad company is compelled because of traffic conditions to change its route and abandon one hundred miles of track. The company petitions the public utilities commission that it be allowed to carry the cost of this abandoned property in the balance sheet as an asset, arguing that the cost of this abandoned line is really part of the cost of the new road. The old line is analogous to the "false work" in a bridge—a necessary step in construction; the new road represents the completed bridge. This contention represents a serious distortion of the term, "construction period." The interval between the time that the road was originally turned over to the operating department, and the completion of the new line is called the developmental or experimental period. The question as to the legitimacy of considering "developmental expense" as a capital charge is entirely distinct from the problems arising in connection with organization and construction. Developmental value will be considered in a later chapter.

[8] It should be observed that any revenue that may be earned during the construction period proper (e. g., revenue from passengers carried by a construction train) should be finally credited to the property accounts.

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The treatment of the accounts which represent the securities issued at the time of organization requires further consideration in this connection. As was stated in Chaper V it seldom happens that the value of the property acquired (even when all legitimate capital expenditures are included) exactly equals the par value of the securities issued. Usually the nominal capitalization *exceeds* the actual investment. This is not an illegitimate situation. It simply means that our financial habits are such that it is difficult to sell securities except at a discount. It would be entirely possible to issue securities that have no repayment dates (such as capital stock) without any nominal value stated; in which case the stock would be entered on the books at the amount actualy realized from its sale. There is something to be said for such a practice. Undoubtedly the investor is often misled by *par* value and *formal* capitalization. These facts give little clue to the actual value of the property. It might be objected that capital stock without a nominal value could not be conveniently handled in accounting records. There is little force to this objection. No difficulty arises in the treatment of partnership and single-proprietor proprietary accounts, because of the absence of a par value for proprietorship; and none need arise in the case of capital stock. It is not necessary, for example, to state a dividend payment as a certain per cent of the nominal value of the stock outstanding. The significant fact is the per cent of actual proprietorship represented by the dividend. If this figure is not convenient, dividends can be expressed simply in dollars per share (net income divided by the number of shares.)

It is customary, however, to enter securities in the financial books at par; and if the value of the property acquired is less than this figure, the amount of the discount is shown in a valuation account. Such an account (in the case of discount on capital stock) is a subsidiary proprietary account. Discount on stock must not be considered as an asset. It is not a cost of the property in any sense, but is an offset to a purely nominal proprietorship. Further, as was shown in Chapter V, the account, Discount on Stock, should be left on the books as a permanent record to prevent the amount of the original investment from becoming obscured. If the amount of discount is extinguished, it should never be through charges against revenue. Discount on stock is not an *expense*, but a *valuation* item. If the profits of later years are retained in the business to make good the amount of discount, it should be done by making appropriations from surplus or net income.

Stocks rarely sell at a premium when first issued, but such a situation occasionally arises. The account which is used to record

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the amount of premium, should be called Capital Surplus or Premium on Stock. Such an account represents part of the original investment, and should be left permanently on the books. An item of stock premium is not a *profit,* and hence must not be considered as part of the general surplus, and available for dividend and other appropriations.

Large enterprises usually make use of bond as well as stock issues to secure the necessary capital. The question as to the proper accounting treatment for items of bond discount and bond premium is an important one; for the analysis of these items seriously affects the statement of net income and hence of proprietorship. Interest on the outside equities must be deducted from revenue before the amount available for the proprietor is determined. Formal interest payments, however, seldom coincide with the actual interest charges of the fiscal period. Hence accounting analysis is necessary to determine the proper interest charge. Bond discounts and premiums are examples of adjustments in the interest rate. This problem is sufficiently complex to be taken up in detail in a later chapter.

Deferred Expense Items

It has been stated above that the Expense and Revenue statement should include all the expenses for the period covered by the statement. It occasionally seems advisable, however, to treat certain extraordinary expenses as items applying not solely to the particular period in which the expense takes place, but to several periods. Suppose, for example, that because of rapid changes in mechanical technique, an electric power company finds a number of dynamos obselete, even though this property has suffered little physical deterioration. It becomes necessary to replace, let us suppose, $50,000 of almost new property with the improved types. Deducting a scrap value of $8,000 this means an expense for the year of $42,000. The management may with reason argue that this is an unusual expense, unlikely to occur again, or at least not oftener than once in several years. Consequently it would seriously distort the Expense and Revenue statement and the resulting net income figure to charge the entire amount into the expense of a single year. The stockholders must be protected, and it is decidedly to their advantage from the standpoint of dividends that net income be a fairly constant amount. Therefore, it is decided to charge but $10,000 of this expense against the revenue of the current year, and to carry $32,000 on the asset side of the balance sheet as a "deferred" expense. This is an entirely legitimate procedure, and

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deferred expense items of this type are very frequently met. Such items, however, must not be confused with the property items. A deferred expense is not an asset, but a deduction from proprietorship which the management has not been willing to recognize as a current deduction, even though the expense has actually occurred. The desire to preserve financial standing, and a reasonably even flow of income is the legitimate excuse for such deferred items. In the case of the railroad mentioned above, the management might be justified in carrying the cost of the one hundred miles of abandoned line as a deferred expense.

Here is a somewhat different illustration. A firm has been involved in litigation for three years. The company's lawyers have been paid nothing but retaining fees. The case is settled and the lawyers are paid $25,000. It seems evident that this is an expense, not of any one year, but of the three years. If it were possible to forecast this expenditure the most desirable procedure would be to charge each year with one-third of the total expense. However, it is very unlikely that the management could estimate in advance the length of the suit or its cost. In this event, the item may be carried as a deferred expense, if it is so large as to seriously affect the current statement, and be charged against the revenues of several fiscal periods.

The balance sheet of almost every large corporation shows one or several deferred expense items. Chary use should be made of such accounts, however, and only in cases where an expense is of such a character that it can reasonably be considered as applying to several periods, should such an item be carried in *suspense,* rather than being charged against current revenue. Further, such accounts should not be carried indefinitely on the books.

Deferred expense items of an entirely different type from the above cases, frequently occur. Such are expenditures for services from which the benefit is not exhausted for a long period. A common illustration is the expenditure for stripping overburden in the of certain kinds of mining properties. In the porphyry copper mines of Nevada, for example, the earth—which may be many feet deep—must be removed from a large area before the actual process of mining the ore can begin. Once the over-burden is removed, the ore is mined very rapidly with steam shovels, and no further expenditure need be incurred for stripping as far as that portion of the ore body is concerned. It may take one or two years to remove the top earth; and in that time not a pound of ore is mined, nor a cent of revenue received. It is common practice in such a case to carry the costs of stripping on the balance sheet as a deferred expense

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item. It should be emphasized, however, that such an item is not really an expense, but rather an asset, representing the value of a service purchased and paid for, but not yet consumed. It is an expense of mining *all* the ore, much as all capital outlay is an expense of earning the revenue throughout the life of the property; and it should be charged as an expense currently, either in proportion to the weight of ore mined or revenue received, in the same manner as any expiration of property due to business operation is charged.

Wasting Assets

Practically all kinds of assets expire in business operation, but many types of property are of such a character that they cannot be replaced concurrently with the expirations, if at all. Such properties are mines, forests, and many other natural resources; and properties arising from state or private grants; such as: patents, copyrights, franchises, leases, etc. Consider, for example, the case of a mine. Every pound of ore removed lessens the value of the remaining property (assuming that there is no change in the price of the product.) A particular corporation may be able to acquire new property of a similar nature, but frequently this is not possible. Then in such a case, if revenue is retained in the business to cover the expiration of wasting property, it must be retained in cash or other funds. It is common practice, however, to return the capital to the stockholders in the form of dividends as the property expires. In such a case the dividend amount must be carefully apportioned between income and the return of the original investment. Otherwise, as is frequently the case, a serious misstatement of net income and proprietorship results. Often the stockholder considers his dividend as pure income, and later, to his surprise, he discovers that his original equity has disappeared. It is imperative that if all property expirations are not included in the statement of expenses, that the residium from the expense and revenue statement be not considered as pure income, and that if this figure be paid in dividends it be carefully apportioned between net income and capital return. This analysis should be made on the financial records of both the corporation and the stockholder.

Patents, franchises, etc., furnish the need for similar analysis. These are all asset items, but they expire in time, and usually cannot be replaced in kind. The amount of property expiration in each case must be treated as an expense, and included in the current statement of expense; or if the deduction is not made from revenue, and capital is returned to the investor this fact should be

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clearly recognized in the accounts. The accounting treatment of wasting assets will be further discussed in Chapter VIII.

Repairs and Replacements—Additions and Betterments

The problem of ascertaining whether a given expediture represents a repair or a renewal (and hence an expense charge), or whether it represents an improvement (and hence is a capital outlay), is often a serious one. Particularly in the case of complex properties such as railroads, it is sometimes a very difficult matter to draw the line between maintenance and improvement. The problem has been rendered unnecessarily complex because of the almost universal tendency to confuse physical and value facts. When it is once clearly recognized that accounting is concerned with the value representations of things, part of the difficulty disappears. Then if a machine which cost $5,000 and has been carried on the books ever since at that figure, is replaced by another machine of like physical efficiency, but costing $6,000, it would seem evident that $1,000 of the new expenditure represents capital outlay. It is true that no more physical product is produced by the new machine than the old, but it is also true that the investment now necessary for the production of this particular product is $6,000. This is simply tardy recognition in the financial records of the fact that the capital cost of producing this commodity has increased. The proper journal entries covering the above transaction would be:

Expense	$5,000	
Old Machine		$5,000
New Machine	$6,000	
Cash		$6,000

The accounts should always show the present value of the property being used by an enterprise in producing its product, if accounting statistics are to furnish the entrepreneur with the information which shall enable him to make rational use of the economic resources at his disposal.

According to this view the new machine mentioned above would be entered at $6,0000 even if its physical efficiency were less than that of the old machine. Or if the machine were of an improved type and cost less or more than the original machine, it should in any case be entered on the books at its cost new. The fact that ninety-pound rails are being used to replace seventy-pound rails, for example, does not tell us whether we are simply maintaining the

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property or are making an improvement. The question is: What is the capital outlay necessary to make this replacement? If this expenditure is greater than the cost of the old equipment, the difference represents an addition to capital; if the necessary expenditure is less than the old cost, then the investment in this particular property item is less than before.

Even if we decide to adopt the above analysis, there are practical difficulties in the way of determining just where to draw the line between repairs and replacements, and improvements. In the up-keep of a complex piece of property, where there is no test of market price, it may be almost impossible to determine which expenditures are properly expenses and which are capital charges. Repairs to a factory building, for example, may be so extensive as to actually increase the value of the building, but it may be very hard to determine just what is the amount of the improvement. Arbitrary estimates are necessary in such cases. Such estimates should, of course be based on all available information in each particular case. The rules of the I. C. C. prescribe that no expenditures of less than $200 shall be considered as additions and betterments. Under this ruling some small improvements will be wrongly charged to expense; but it is expected that errors in the other direction will approximately offset any such charges.

In any industry in which improvements in mechanical technique are taking place very rapidly, and all repairs and renewals are charged to expense, over statement of expense, and under statement of property is quite likely to result[4]. This was the case in many American railway properties. Old locomotives were scrapped and replaced with more costly types, and the entire cost of the new equipment was considered as a replacement. Such a practice results in what are called *secret reserves*. Such a reserve is an item of proprietorship which represents profits retained in the business, but which does not appear on the balance sheet because the property is understated by just the amount of the reserve. This practice is entirely illegitimate. It may not mean as direct a step toward financial disaster as the opposite error—the overstatement of property and the understatement of expense—but the individual stockholder is misled and often suffers from such a practice. Further, accounts which do not represent at least approximately the actual situation cannot serve the purposes for which financial statistics are intended. It should be observed that the practice of charging improvements to expense followed by some

[4] See Chapter VIII.

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railroad companies in their early history did not in every case lead to the understatement of property. For in many cases the original property figures were much too large. In such a case an overstatement of expense means that profits are being retained in the business—although this is not recognized by the accounts—and are building up a previously overstated property; or, in other words, are making good equities which have been only nominal up to this time.

Probably repairs and renewals are more often charged to property than are improvements charged to expense. The desire on the part of the management to make a good showing of net income is often responsible for such a procedure. Frequently, however, an error is made in the analysis of expenditures. Expenditures which are made for the purpose of earning the revenue of a single fiscal period, and have no value at the end of that period, must be carefully distinguished from expenditures which mean permanent improvement. From the standpoint of financial success, the error of charging repairs and renewals to property is more serious than the practice which leads to secret reserves. Errors in either direction, however, are serious from the accounting standpoint, and should be avoided as far as possible.

Appreciation and Depreciation

As was stated in Chapter II property values may either increase or decrease. A property item may receive an increase in value because of physical additions or because of an advance in the level of prices. *Appreciation* is the term applied to the second type of value increase; whenever the value of an asset increases, without the addition of new units, it is said to have appreciated. Decreases in property value are of three kinds: (1) A property item may decrease in value because of the withdrawal of specific units; (2) A property may decrease in value because of a fall in the level of prices; (3) properties may decrease in value because of physical decay in business operation and expirations due to the passage of time. (1) and (3) are similar, but the withdrawals in the latter case are such that they cannot be conveniently measured. *Depreciation* is the term applied to the second and third types of value expirations.

The question arises: to what extent should these value changes be shown by the accounts? According to the view already developed, the accounts, if they are to be scientifically accurate, should record *all* these changes, and immediately. That is, the accounts should be as sensitive as possible to all price and value changes.

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However, it is not possible in all cases to determine value changes as they occur; and even if this were possible it would not be feasible to record all changes in the accounts. For example, such property items as merchandise, raw materials, etc., which move rapidly through the business process, are subject to current fluctuations in price. It is not expedient to follow all these changes in the accounts. It is considered good practice to leave such commodities on the books at cost, unless there is a significant change in price. This rule is sometimes given: use cost prices unless market prices are lower, in which case use market prices. Such a rule is unreasonable. If it were practically possible all changes in either direction should be registered by the accounts. Since this is not the case, the rational procedure is to use cost prices unless market prices fall or rise considerably or a long interval is involved; in which case use market prices. Assets such as securities are often subject to daily fluctuations. It would not be wise to attempt to follow these changes in the accounts. Often security prices fluctuate because of minor causes, and in such cases their prices do not accurately reflect the value of the enterprises represented. Here as in the case of materials and the like, the reasonable course is to use cost prices unless market prices are widely divergent and for a long period, in which case securities should be valued at the market.[5]

The value changes which affect property items of a permanent character, such as buildings, machinery, etc., are usually *decreases*. Any possible appreciation in such cases is normally more than offset by depreciation. An important exception is land. In general all land properties increase in value with the growth of the community. As far as it can be definitely ascertained this appreciation should appear in the accounts. Both public and private interests wish to know what economic resources are being devoted to a particular end. It is sometimes objected, that if a factory site, for example, appreciates, it does not add anything to the physical efficiency of the site for manufacturing purposes; hence it should not be considered in the accounts. This objection is not valid. If all similar factory sites have risen in value, an advance in the price of the product in question will follow. If only the value of a particular site has increased, due to conditions entirely outside of the industry involved, this fact should be recognized in the accounts in order that the entrepreneur realize the situation, and either make more efficient use of the property or move the enterprise as soon

[5] Banking institutions are compelled to recognize current changes in the prices of the securities which they hold as assets.

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as feasible to a cheaper site. For it is evident that a piece of land is being devoted to a purpose for which it is too valuable, either from the standpoint of public or private interest. There are practical difficulties in the way of recognizing such appreciation in the accounts. In the first place if land appreciation is countenanced by good practice, unwarranted estimates may be used; as there is no test of purchase and sale, and values are determined from the prices of contiguous property. Further, there is a tendency to credit these increases to current revenue in lean years, which is illegitimate. Increases in land value should not be used in inflate current income, but should be credited to accumulated surplus; thus:

Land	$10,000	
Surplus		$10,000

If, however, increases in land value are conservative estimates, and are not used to juggle the current Income sheet, there is no valid reason for keeping such items out of the accounts.

The principles of depreciation accounting will be fully discussed in Chapter VIII.

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VII

THE INTEREST PROBLEM IN ACCOUNTING

It is generally recognized that interest on capital is a deduction which must be made from revenue before profits are available for distribution to the proprietor. In modern industry the entrepreneur usually supplies some of the capital, his investment being represented in the proprietary accounts; all other capital is supplied by outside creditors whose equities are represented in the liability accounts. In financial accounting it is customary to consider only the interest which accrues to creditors as a cost, and as such chargeable against revenue; all income accruing to the proprietor being considered as profits. The payment of profits to the proprietor, therefore, contains two parts: one, a consideration for the use of capital—interest; and the other, a payment for risk-taking, profits.

The question as to whether interest on the proprietor's capital should be considered as a cost and treated as a charge against revenue, is of especial interest to the cost accountant. In determining the relative costs of different processes in production, interest on capital employed is one of the factors which must be considered. In treating the subject of accounting from the point of view of the proprietor, however, this is of little importance if it is remembered that the income received by the proprietor includes a payment of interest on his capital. Another question of importance is whether all interest should be treated as a charge against revenue or should be considered as a distribution of income. This question will be discussed more fully in a later chapter.

In this chapter two problems will be considered, namely: (A) the mathematical computation of interest; and (B) the accounting entries for recording transactions involving interest. Only the entries which arise from transactions with others than the proprietor will be considered.

A. THE MATHEMATICAL COMPUTATION OF INTEREST

Interest is frequently defined as a consideration for the use of capital. It often happens that the contract for the use of capital

[1] It is assumed that the reader has a knowledge of the fundamental principles of algebra.

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specifies that the payment for its use be made at dates which vary from the dates covered by the income statement. Since interest accrues as a function of time, it is essential that the interest account represent the actual accrual of interest during a period covered by an Expense and Revenue statement. Furthermore, it often happens that repayments on a loan include both a return of capital and interest. It is essential that these two elements be separated and properly apportioned between accounts appearing in the Expense and Revenue statement and the Balance Sheet. Mathematical computations are often necessary to determine the amount of interest involved; and it is for the use of the accountant in such cases that the formulae in the following pages are developed. These formulae will be numbered consecutively and will frequently be referred to by number.

Simple and Compound Interest

The amount of capital invested is called the *principal.* The unit of time which is used in interest calculations is the *year.* The total total interest accruing on *one dollar* in *one year* is the *rate of interest.* The rate of interest is usually expressed as a rate per cent, but in mathematical computations it is expressed as a decimal. When interest is added to the principal at certain stated intervals and interest is earned on the sum, the process is called *compounding,* and the interest is called *compound* interest. The number of intervals per year at which interest is compounded is called the *frequency of conversion.* When interest is not added to the principal in this manner, it is called *simple* interest.

The distinction between simple and compound interest is an important one inasmuch as contracts are frequently entered into on either basis. Suppose that a principal of $100.00 is invested at 6% simple interest for five years. The principal would accumulate during the five years as shown by the following table:

(1) Year	(2) Principal on which interest is computed	(3) Interest during year	(4) Sum at end of year
1	$100.00	$6.00	$106.00
2	100.00	6.00	112.00
3	100.00	6.00	118.00
4	100.00	6.00	124.00
5	100.00	6.00	130.00

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The total interest for the five years is $30.00 which is five times the interest for one year. The formula for the accumulation of a sum by simple interest may be developed from this schedule. Let P represent the principal; S the sum to which it will accumulate; i the rate of interest; and n the number of years; then:

$$(1) \qquad \begin{aligned} S &= P + Pni \quad \text{or,} \\ S &= P\,(1 + ni) \end{aligned}$$

If $100.00 is invested at 6% compound interest convertible annually, the amounts would be as follows:

(1) Year	(2) Principal on which interest is computed	(3) Interest during year	(4) Sum at end of year
1	$100.00	$6.00	$106.00
2	106.00	6.36	112.36
3	112.36	6.74	119.10
4	119.10	7.14	126.24
5	126.24	7.57	133.81

The total interest for the five years in this case is $33.81. Using the same symbols as before we may develop the formula for the accumulation of a sum at compound interest convertible annually as follows:

The sum at the end of 1 year is $P + Pi = P\,(1 + i)$

The sum at the end of 2 years is $P\,(1 + i) + P\,(1 + i)\,i = P\,(1 + i)^2$

The sum at the end of 3 years is $P\,(1 + i)^2 + P\,(1 + i)^2 i = P\,(1 + i)^3$

The sum at the end of 4 years is $P\,(1 + i)^3 + P\,(1 + i)^3 i = P\,(1 + i)^4$

The sum at the end of n years is $P\,(1 + i)^{n-1} + P\,(1 + i)^{n-1}\,i = P\,(1+i)^n$

Therefore:

$$(2) \qquad S = P\,(1 + i)^n$$

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When the frequency of conversion is 2, $100.00 would accumulate at 6% for 5 years as follows:

(1) Half year period	(2) Principal at beginning of period	(3) Interest during period	(4) Sum at end of period
1	$100.00	$3.00	$103.00
2	103.00	3.09	106.09
3	106.09	3.18	109.27
4	109.27	3.28	112.55
5	112.55	3.38	115.93
6	115.93	3.48	119.41
7	119.41	3.58	122.99
8	122.99	3.69	126.68
9	126.68	3.80	130.48
10	130.48	3.91	134.39

The total interest for five years in this case is $34.39. In this case the interval of time is one-half year, the rate of interest employed per period is one-half the stated annual interest, and the number of periods is twice the number of years. If we accept these new units, in place of the year, rate of interest per year, and the number of years, respectively; it is clear that the sum accumulates in conformity with formula (2). If the annual interest rate is represented by (j) and the frequency of conversion by (m), then the rate per period would be (j/m) and the number of periods (mn). Then by the same reasoning as for formula (2) we may obtain:

$$S = (1+j/m)^{mn} \tag{3}$$

Substituting the amounts given in the illustration:

$$S = 100\,(1+.06/2)^{10} = \$134.39$$

When interest is compounded more frequently than once a year, the stated rate of interest without compounding is called the *nominal* rate of interest, while the rate actually realized in one year is called the *effective* rate of interest. The effective rate will be somewhat larger than the nominal rate. In the illustration just given, the nominal rate is 6% convertible semi-annually. The effective rate may be found by dividing the interest accruing during one year by the principal at the beginning of the year. The interest for the first year was $6.09, and the principal at the beginning of the first year was $100.00; the effective rate of interest therefore was 6.09%.

It is sometimes desirable to express one rate in terms of the

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other. This problem may be stated in this manner; if the nominal rate is j convertible m times per year, what is the effective rate? The accumulation at the nominal rate would be $(1 + j/m)^m$ in one year. The interest would be $(1 + j/m)^m - 1$. But this is the effective rate by definition, therefore:

$$i = (1 + j/m)^m - 1 \tag{4}$$

Solving this equation for j we may obtain the nominal rate in terms of the effective rate.

$$j = m\left((1 + i)^{1/m} - 1\right) \tag{5}$$

If the effective rate desired is 6% and interest is to be convertible semi-annually then the nominal rate which should be employed may be found by equation (5):

$$j = 2\left((1.06)^{1/2} - 1\right) = 5.96\%$$

Discount

When a deduction is made from a sum due at a future date as a consideration for the use of capital, the amount deducted is called *discount* and the process is called *discounting*. The amount deducted is in the nature of interest, the process of discounting being one method of determining the amount of interest in certain transactions. The total discount on one dollar of the sum due in one year is the *rate* of discount. The rate is usually expressed as a percentage, although in mathematical computations it is given in decimal form. If the sum due is discounted successively at stated intervals, the process is called *compound* discounting and the discount is *compound* discount. If the sum due is not discounted successively, the discount is called *simple* discount.

If a sum of $100.00 due in five years were discounted at the rate of 6% simple discount, the amount of *discount* would be five times the annual discount, or $30.00. The present value of the sum would be 100.00 — 30.00 = $70.00. The formula for determining the present value of a sum due at simple discount may be developed from the definition. Let P be the present value, S the sum due, n the number of years, and d the rate of discount. Then:

$$P = S - S\,nd \quad \text{or} \quad P = S(1 - nd) \tag{6}$$

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If the sum of $100.00 due in five years were discounted at a rate of 6% compound discount, convertible annually, the present value could be determined from the following table:

Discounting	$100.00	for one year =	$6.00	leaving	$94.00
Discounting	94.00	for one year =	5.64	leaving	88.36
Discounting	88.36	for one year =	5.30	leaving	83.06
Discounting	83.06	for one year =	4.98	leaving	78.08
Discounting	78.08	for one year =	4.68	leaving	73.40

The present value of the sum $73.40. If P represents the present value of the sum in n years, S the sum, n the number of years, and d the rate of discount, as before; and P_1, P_2, P_3.....P_n represent the present values obtained from discounting the sum, one year, two years,.....n years respectively; then:

$$S - Sd = S(1-d) = P_1$$
$$S(1-d) - S(1-d)d = S(1-d)^2 = P_2$$
$$S(1-d)^2 - S(1-d)^2 d = S(1-d)^3 = P_3$$
$$S(1-d)^{n-1} - S(1-d)^{n-1} d = S(1-d)^n = P_n$$

but, $P_n = P$ therefore:

$$P = S(1-d)^n \tag{7}$$

If the frequency of conversion is greater than one, the present value of the sum may be found by the same process as for compounding annually, using the rate for the period of conversion in place of the annual rate, and the number of periods in place of the number of years. If the stated rate per year is represented by f and the frequency of conversion by m, then the rate per period is f/m, and the number of periods mn. The formula becomes:

$$P = S(1 - f/m)^{mn} \tag{8}$$

If the amount of $100.00 due in five years were discounted at 6% compounded semi-annually, then:

$$P = 100(1 - 06/2)^{10} = \$73.74$$

When discount is compounded more frequently than annually, the rate per year without compounding is called the *nominal* rate of discount while the actual amount of discount on one dollar in one year is called the *effective* rate. If f represents the nominal rate, and m the frequency of conversion, then the amount of discount on one

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dollar is: $1 - (1 - f/m)^m$ which is by definition the effective rate d. Therefore:

(9) $$d = 1 - (1 - f/m)^m$$

Solving this equation for f we have:

(10) $$f = m\,(1 - (1 - d)^{1/m})$$

The Relation Between Interest and Discount

It is obvious that interest and discount are fundamentally the same thing, each being consideration for the use of capital. The essential difference between the two is that interest is an amount *added* to the present sum or principal to determine the future sum, while discount is an amount *deducted* from a sum due in the future to determine the present value of that sum. The rate of interest which is applied to the present sum to obtain the amount of interest must be clearly distinguished from the rate of discount which is applied to the future sum to obtain the amount of discount. The application of a certain rate of discount to a sum due will produce an amount which will give a higher rate of interest on the present value. For instance, if $100.00 due one year from date is discounted at the rate of 6%, the discount is $6.00 and the present value is $94.00. The amount of interest ($6.00) on the capital invested ($95.00) gives a rate of 6.38%.

It is sometimes desirable to obtain a rate of discount which will produce a given rate of interest on the present value of the sum. If the simple rates of interest and discount are used, then by formula (1): $S/P = (1 - ni)$ and by formula (6): $S/P = 1/1 - nd$ and since S and P must be the same in each equation: $1 + ni = 1/1 - nd$, and:

(11) $$i = d/1 - nd$$

The converse of this problem may be found by solving the equation for d, which gives:

(12) $$d = i/1 + ni$$

If the compound rates of interest and discount are used, then by formula (2): $S/P = (1 + i)^n$ and by formula (7): $S/P = 1/(1 - d)^n$ from which we may obtain:

(13) $$i = (1/1 - d) - 1$$

and:

(14) $$d = 1 - (1/1 + i)$$

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If the interest and discount are compounded m times per year, then by formula (3): $S/P = (1+j/m)^m$ and by formula 8: $S/P = 1/(1 - f/m)^m$, therefore: $(1 + j/m)^m = 1/(1 - f/m)^m$ from which we may obtain:

(15) $$j = 1/(1-f/m)^m - 1$$

and:

(16) $$f = 1 - 1/(1+j/m)^m$$

Whenever it is necessary to obtain the present value of a future sum in order to realize a certain rate of return on the present value these formulae will be of service. Substituting the value of d as found in formula (14) in formula (7), we have:

(17) $$P = S\,(1/(1+i)^n)$$

If the interest is convertible m times per year the equation becomes:

(18) $$P = S\,1/(1+j/m)^{mn}$$

If the sum is one dollar, making $S = 1$, then equation (17) becomes:

(19) $$P = 1/(1+i)^n$$

This means that one dollar due n years from date has a present value at rate i of: $1/(1+i)^n$

Tables have been prepared giving values for this expression at different rates of interest and for a varying number of years. These tables may be used in determining the present value of any sum by substituting the value found in the tables in formula (17).

In like manner if the principal be taken as one dollar in formula (2), then:

(20) $$S = (1+i)^n$$

This means that the amount to which one dollar will accumulate in n years at the interest rate i would be $(1+i)^n$. Tables have also been prepared for this expression for different values of (i) and (n).

Annuities

An *annuity* is a series of payments made at equal intervals during a length of time specified by contract. The amount paid on an annuity in one year is called the annual *rent*. The rent may be paid in one amount or in several installments at equal intervals during the year. The problems of the accountant in conection with an-

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nuities are: (1) to find the present value at a given rate of interest; (2) to find the amount to which an annuity will accumulate at a given rate of interest; and (3) to apportion the rent between interest and a repayment of principal.

The present value of an annuity is obviously the sum of the present values of each of the payments. Suppose that it is desired to find the present value of an annuity of one dollar per year for n years. The present value would then be the sum of the present values of one dollar due in one year; one in two years; one in three years; etc.; up to and including one in n years. Let a_n represent the present value of an annuity of one dollar per year for n years; then using equation (19), with n equal to 1, 2, 3, etc., up to n, we have: $a_n = 1/1+i + 1/(1+i)^2 + 1/(1+i)^3 \ldots\ldots 1/(1+i)^n$ if V is substituted for $1/1+i$, the equation becomes: $a_n = V+V^2+V^3+\ldots\ldots+V^n$

The right side of this equation is a geometric series which may be summed to the expression $V(1-V)^n/(1-V)$; therefore: $a_n = V(1-V)^n/(1-V)$; and, replacing $1/1+i$ for V, we have:

$$(21) \qquad a_n = \frac{1-(1/1+i)^n}{i}$$

The numerator of this equation is the total discount on one dollar due in n years and the denominator is the rate of interest. It is a relatively simple matter to find the present value of an annuity from this equation with the aid of tables of logarithms. Tables have been prepared giving values for a_n at different rates of interest and for a varying number of years. The present value of an annuity of R rent per year would be R times the present value of one dollar per year for the same number of years.

If the rent is payable m times per year and the rate of interest is j, convertible m times per year, the formula for the present value of an annuity of one dollar per year is:

$$(22) \qquad a_n = \frac{1-1/(1+j/m)^{mn}}{(1+j/m)^m-1}$$

When an annuity is continuous, it is called a perpetuity. The present value of a perpetuity may be obtained from formula (21) when n is infinity, $a_n = \left((1-1)/(1+i)^{\infty}\right)/i$, which reduces to:

$$(23) \qquad a_n = 1/i$$

This formula shows that the present value of a perpetuity of one dollar per year is one divided by the interest rate.

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The amount to which an annuity will accumulate if the separate payments are invested at a specified rate of interest will be the sum of the amounts to which each payment will accumulate. If we let S_n represent the amount of the annuity, then by formula (20), taking n equal to n, n-1, n-2, etc., to and including 1: $S_n = (1+i)^n + (1+i)^{n-1} + (1+i)^{n-2} + \ldots\ldots + (1+i)$

Summing this series we obtain:

$$(24) \qquad S_n = \frac{(1+i)^n - 1}{i}$$

The numerator of the right side of this equation is the total interest on one dollar for n years and the denominator is the rate of interest.

This formula is of use where it is desired to create a sinking fund to accumulate at a certain rate to a given sum. Suppose it is desired to accumulate a fund of $1,000.00 in ten years by setting aside an equal amount each year at 6%; what will be the annual payment to the fund? By formula (24), the amount to which one dollar per year will accumulate in ten years may be found: $S_{10} = (1.06)^{10} - 1/.06 = \$13.1808$. The annuity which will amount to one dollar is: $1/13.1808 = .075587$. The annuity which will accumulate to $1,000 would be 1,000 times $.07587 = \$75.87$. If R represents the annual payment to a fund which will accumulate to one dollar in n years, then:

$$(25) \qquad R = \frac{1}{S_n} = \frac{i}{(1+i)^n - 1}$$

It is necessary to apportion the payments of an annuity between interest and a repayment of capital. Suppose that an annuity of $20,000.00 per year for five years, payable semi-annually, is sold on a 5% basis; then the present value of the annuity would be found by formula (22) to be $87,520.64; and that is the amount received for the annuity. In each $10,000 payment that is made on the annuity, a part is interest for the use of the capital and a part is a return of the original capital. If the annuity were purchased on a 5% basis payable semi-annually, the investor will necessarily receive 2½% on the amount of his capital remaining in the investment each half year. All that he receives *over* this amount will be a return of part of his investment. The proportion of interest and

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capital in each of the payments on this annuity may best be shown in tabular form as follows:

(1) Half yearly period	(2) Capital beginning of period	(3) Annuity payment	(4) Interest	(5) Repayment of capital
1	$87,520.64	$10,000	$2,188.02	$7,811.98
2	79,708.66	10,000	1,992.72	8,007.28
3	71,701.38	10,000	1,792.53	8,207.47
4	63,493.91	10,000	1,587.35	8,412.65
5	55,081.26	10,000	1,377.03	8,622.97
6	46,458.29	10,000	1,161.46	8,838.54
7	37,619.75	10,000	940.49	9,059.51
8	28,560.24	10,000	714.01	9,285.99
9	19,274.25	10,000	481.85	9,518.15
10	9,756.10	10,000	243.90	9,756.10

It is very important that the accountant distinguish clearly between the amounts of interest (column 4) and the repayment of the capital (column (5).

Bonds

A bond is a promise to pay a certain sum called the *principal* at a future date and certain smaller sums at regular intervals until the principal is paid. The smaller payments are called *bond interest* because they bear a ratio to the par value of the bond *approximating* the interest rate. There is a fundamental difference, however, between bond interest and the interest which the accountant enters in the interest revenue or expense account. A five-year, $1000 bond, 4% interest payable semi-annually, is made up of two parts; one a promise to pay $20.00 every six months for five years, and the other a promise to pay $1000 at the end of five years. The 4% stated in the bond is simply a means of expressing the amount of the annuity. The present value of this bond would depend on the market rate of interest for this class of security. The promises to pay will then be valued at the market rate of interest. Suppose that the market rate of interest is 5%. The problem is: what is the present value of the two promises to pay at 5%? The present value of the $1000 due in five years at 5% convertible semi-annually may be found by formula (18) $P = 1000/(1/1.025)^{10} = \$781.20$. The present value of the annuity of $40 per year payable semi-annually may be obtained by formula (22):

$$a_{10} = 20\,\frac{1-(1/1.025)^{10}}{(1.025)^2-1} = \$175.04.$$

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The value of the bond would be the sum of these two values, or $956.24.

The difference between the par of the bond and the present value, when the present value is the smaller, is called *bond discount*. Bond discount is part of the interest. The total interest is the difference between the original loan of capital and the amount repaid. The amount of capital invested in this bond is $956.24. The amount to be repaid is the principal, $1000, plus 5 times the annual rent of $40, or $1200. The total interest therefore is 1,200 — 956.24 or, $243.76. This is paid in two parts; $200 in the annuity payments and $43.76 in the principal payment. The interest which accrues each year is 5% of the amount invested controvertible semi-annually. The amount invested at the beginning of the first year is $956.24. The interest which accrues in the first half year is 2½% of $956.24 or $23.91. Only a part of this interest is paid at this time, $20.00, leaving $3.91 which must be added to the original capital on which interest will be computed during the next period. Interest during the second half year will amount to 2½% of $960.15 or $24, of which $20 is paid in cash leaving $4.00 to be added to the investment. This process carried to the end of the fifth year will bring the investment figure up to $1000, the par of the bond, at which time $1000 is paid. This method is simply an application of the principle of accumulation at compound interest. The accumulation for a year is first determined and then reduced by the amount of the payment. This process is called *accumulation of discount*. The following table will illustrate the accumulation of the investment in this bond:

(1) Half year period	(2) Investment in bond beginning of period	(3) Interest on investment	(4) Amount of payment	(5) Accumulation
1	$956.24	$23.91	$20.00	$3.91
2	960.15	24.00	20.00	4.00
3	964.15	24.10	20.00	4.10
4	968.25	24.21	20.00	4.21
5	972.46	24.31	20.00	4.31
6	976.77	24.42	20.00	4.42
7	981.19	24.53	20.00	4.53
8	985.72	24.64	20.00	4.64
9	990.36	24.76	20.00	4.76
10	995.12	24.88	20.00	4.88
				43.76

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Suppose this same bond was sold to yield 4% on the investment. The present value of the bond would be found by discounting the principal and the annuity payments at the rate of 4% convertible semi-annually: $P = 1000\ ((1/1.02)^{10}) = \$820.35$;

$$a_{10} = 20\frac{1 - 1/(1.02)^{10}}{(1.02)^2 - 1} = \$179.65;\ \text{and}\ P + a_{10} = \$1000.$$

The bond in this case is sold at par. Each of the annuity payments will just equal the amount of interest which accumulates during the same period, and the investment will remain at $1000.00, throughout the life of the bond.

Suppose now that the same bond is sold to yield 3% payable semi-annually. The present value of the bond in this case would be determined by discounting the principal and annuity payments at the rate of 3% semi-annually: $P = 1000\ ((1/1.015)^{10}) = \$861.67$;

$$a_{10} = 20\frac{1 - 1/(1.015)^{10}}{(1.015)^2 - 1} = \$184.44;\ \text{and}\ P + a_{10} = \$1046.11.$$

The difference between the investment in the bond and the par value when the investment is *greater* than par, is called *bond premium*. The bond premium is a part of the capital investment which is returned to the investor in the annuity payments. The amount invested in this bond is $1,046.11; the accumulation during the first half year is 1½% of this amount, or $15.69. The payment at this time, however, is $20.00; the difference of $4.31 is a return of part of the investment leaving $1,041.80 invested. Interest accumulates on this amount at 1½% during the second period which

(1) Half year period	(2) Investment in bond beginning of period	(3) Interest on investment	(4) Amount paid	(5) Amortization of premium
1	$1,046.11	$15.69	$20.00	$4.31
2	1,041.80	15.63	20.00	4.37
3	1,037.43	15.56	20.00	4.44
4	1,032.99	15.49	20.00	4.51
5	1,028.48	15.43	20.00	4.57
6	1,023.91	15.36	20.00	4.64
7	1,019.27	15.29	20.00	4.71
8	1,014.56	15.22	20.00	4.78
9	1,009.78	15.15	20.00	4.85
10	1,004.93	15.07	20.00	4.93
				46.11

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gives $15.63. A payment of $20.00 is made, $4.37 being a return of part of the capital invested. This process, continuing through five years, brings the investment in the bond down to par at the date it is paid. The writing down of the investment by this process is called *amorization of premium.* The table on page 118 shows the amortization of premium on this bond.

Column 5 represents that part of the capital investment which is returned in the annual payments. The importance of the proper treatment of these amounts may well be illustrated by the case of an estate of $1046.11 which is left to a remainder man, while the income from the estate is left to a life tenant. The life tenant should receive only the amounts in column 3 while the amounts in column 5 should be reinvested as part of the estate. If the annual payments (column 4) were given to the life tenant, the estate would be reduced at the end of five years from $1046.11 to $1000.00.

The method for finding the present value of a bond may be expressed in formula. Let B represent the present value of the bond, S the par value of the bond, R the annual payment during the life of the bond, i the rate of interest at which the bond is valued, and n the number of years; then:

$$(26) \qquad B = S\,(1(1+i)^n) + R\,(1-1)/(1+i)^n) \div i$$

When the payments are made m times per year and the nominal rate is j, the equation becomes:

$$(27) \qquad B = S\,(1/(+j/m)^{mn}) + R/m\,\frac{1-1/(1+j/m)^{mn}}{(1+j/m)^m - 1}$$

Bonds are usually issued with the payments made semi-annually, and bond tables are prepared on that basis.

It may be noticed that when the interest rate and the rate stated in the bond are the same, the present value of the bond is equal to par; and when the rate of interest differs from the rate in the bond, the bond discount or premium is equal to the present value of an annuity, the annual rent of which is measured by the difference between the bond interest and the amount the bond interest would be at the market rate of interest. This fact is the basis of another and more simple method of valuing a bond. If R represents the bond interest payment, I the amount the bond interest would be at the market rate, and D the amount of discount or premium, then: $D = (R - I)\ a_n$
and:

$$(28) \qquad D = (R - I)\ (1-1/(1+i)^n \div i$$

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When R is less than I, D is the discount; and when R is greater than I, D is the premium. If interest is payable m times per year, the equation becomes:

$$(29) \qquad D = (R-I)m\frac{1-1/(1+j/m)^{mn}}{(1+j/m)^{m}-1}$$

Using this formula we may find the value of the bond mentioned above at the effective rates of 5% and 3% respectively:

$$D = (40-50)/2\left(\frac{1-1/(1.025)^{10}}{(1.025)^{2}-1}\right) = -43.76$$

$43.76 is the bond discount which deducted from the par value leaves $956.24, the value of the bond at 5%.

$$D = (40-30)/2\left(\frac{1-1/(1.015)^{10}}{(1.015)^{2}-1}\right) = 46.11$$

The bond premium is $46.11 which must be added to the par value to obtain $1046.11, the value of the bond at 3%.

Determining the Interest Rate

Frequently bond transactions take place at a quoted price when the effective rate of interest is unknown. It is necessary to determine the effective rate involved in this price in order to make the proper accounting entries. In formula (26) for finding the present value of a bond, there are five quantities: B, S, R, n and i. Theoretically if any four of these quantities are known the fifth may be determined by algebra. Considerable difficulty would be encountered in attempting to solve this equation for i; hence, it is more convenient to determine the rate by approximation.

It is possible to approximate the actual interest rate by the use of trial rates. If two trial rates are obtained fairly close to the actual rate, it is possible to interpolate by proportions and obtain a close approximation. The rate thus obtained may be used as a new trial rate and the process repeated until the actual rate is found. Usually one interpolation gives a rate sufficiently accurate for practical purposes. If i represents the actual rate, and A the present value at rate i; i′ the first trial rate and A′ the present value at rate i′; i″ the second trial rate and A″ the present value at rate i″; the

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following ratio is approximately true: $i-i'/i''-i' = (A - A')/(A'' - A')$; therefore:

(30) $$i = i' + \left((A-A')/(A''-A') \; (i'' - i') \right)$$ (approxi-

mately). The two trial rates i′ and i″ should be as near the actual rate as possible and it is preferable that one be larger and one smaller. In case the difference between the rate stated in the bond and the actual rate is small, the rate in the bond may be used as the second trial rate; thus making A″ equal the par value of the bond, and leaving A′ as the only other amount to be calculated.

Suppose that a 20-year 4% bond, interest payable semi-annually, is purchased for $1109.66; the par value being $1000. The present value A′ at rate 3% (i′) would be $1149.58; and A″ at rate 3½% (i″) would be $1071.49. Using formula (30), we have: $i = .03 + (1109.66-11.49.58)/(1071.49-1149.58)(.035-.03) = 3.255\%$, the approximate rate of interest. In case a closer approximation is desired, this could be used as a new trial rate but this is unnecessary for practical purposes.

When a bond is purchased between interest payment dates the seller generally receives from the purchaser simple interest from the last interest payment date to cover the accrued interest. Thus suppose a 5% bond due May 1, 1921, interest payable May and November, is sold on a 4% basis on August 1, 1916. The value of the bond at 4% May 1st was $1044.91; and the purchaser will pay this amount plus simple interest at the rate of 4% for three months, or $10.45, making the total price $1054.36. This method although scientifically incorrect, is the one which is employed in commercial transactions. It is evident that this method works slightly to the disadvantage of the buyer. He fails to realize the full effective rate of interest for the remaining months preceding the next interest payment date. To be scientifically accurate, and to avoid this injustice, the price of the bond should be determined by using the effective rate for three months on the May 1st value. From formula (3), $1044.91 $(1+.04/2)^{\frac{1}{4}} = 1050.13$. The amount which is unjustly charged to the buyer is $4.23.

B. ENTRIES FOR TRANSACTIONS INVOLVING INTEREST

The transactions which frequently occur involving interest calculations will be considered in relation to the proper method of treatment in journal entries. A debit or credit to the interest account

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will in each case mean a charge against or credit to the revenue for the period covered by the interest entries.

Notes Payable

The most common transaction is the giving of a promissory note for an amount received. The amount received may be cash, or other property equal in value to cash. In as much as that part of the entry for recording the consideration for the note will necessarily be a debit to *some* property account, the cash account will always be used in the illustrations. If property other than cash were received for a note, the particular property account affected would be debited for the amount. In the same manner, the payment of the note may be made in either cash or property, but the cash account will be used in all illustrations.

Suppose that the A. B. Co. borrows $1000.00 on a sixty day 6% note. If the market rate of interest is 6% the note will bring $1000.00; and the entry will be:

Cash	$1000.00	
Notes Payable		$1000.00

At the end of 60 days when the note becomes due, the payment will be $1000.00 plus the interest for 60 days at 6%[2]. The entry for recording the payment of the note would be:

Notes Payable	$1000.00	
Interest	10.00	
Cash		$1010.00

Suppose that the A. B. Co. had given a 60-day non-interest note. This is simply a promise to pay $1000.00 in 60 days. If this note were discounted at 6%, the entry would be:

Cash	$990.00	
Discount	10.00	
Notes Payable		$1000.00

[2] The ordinary method of determining the amount of interest for a stated number of days, is to consider the year as having 360 days. The interest on this note would be one year's interest ($60) times 60/360, or $10.00. If a note runs for a stated number of months, each month is taken as 1/12 of a year regardless of the number of days in the month.

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Discount is debited for $10.00 this being the amount of interest which will accrue on $990.00 during the ensuing 60 days, at which time discount should be closed into the interest account. It is customary to charge Interest rather than Discount at the time the note is issued for short term notes, but it must be remembered that the interest cost has not been incurred at that time, but accrues during the ensuing period. At the time the note is paid Notes Payable would be debited for $1000.00 and Cash credited for $1000.00.

The discount rate of 6% gives an interest rate of 6.38% as was shown earlier in this chapter. When the market rate of interest is 6% and a note is discounted at a 6% rate of discount, we have what is called *bank* discount. If the note is discounted at a rate which will yield the market rate of interest on the amount of the loan, it is called *true* discount. By formula (14) the rate of discount corresponding to the 6% rate of interest is found to be 5.66%. The amount of discount on this note would be $9.43, the entries being in the same form as before.

Notes Receivable

A promissory note in the possession of the party to whom it is payable is an asset and is entered in the notes receivable account. The entries would be the reverse of those appearing on the books of the borrower. A note for $1000.00 at 6% for 60 days would be entered on the books at the time it is received; thus:

Notes Receivable	$1000.00	
Cash		$1000.00

and at the time it is paid:

Cash	$1010.00	
Notes Receivable		$1000.00
Interest		10.00

The amount of the discount is an interest earning of the 60 days following the acquisition of the note, at which time it should be closed into the interest revenue account. If the rate of true discount were used, the entry would be the same except that the discount would be $9.43; and the cash payment, $990.57. At the time the note is paid the entry would be:

Cash	$1000.00	
Notes Receivable		$1000.00

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Annuities

The issuing of annuities to raise capital is less frequent in America than in England. In the later country it is common practice for the various governmental divisions of the state to raise funds with annuities and perpetuities. It is the practice of some insurance companies in this country to pay the beneficiaries of policies in the form of annuities. The opportunities for raising capital in corporations have not been fully realized, but undoubtedly there is developing a tendency in this direction as evidenced by the large number of corporations which are issuing serial bonds. Such securities are but one step removed from the annuity.

The entries for recording annuity transactions are somewhat complex and may best be illustrated by giving the entries for the annuity described in the early part of the chapter: first, on the books of the company issuing the annuity; and second, on the books of the purchaser. The company receives $87,520.64 and agrees to repay $100,000 during a period of five years. The difference between the two amounts is the interest on the amount invested. The liability at the date of issue equals the amount received. The entry would be:

Cash	$87.520.64	
Annuity Payable		$87.520.64

The entries at each payment may be obtained from the table on page 116. The first payment of $10,000 is made up of $2,188.02 in interest and $7811.98 as a decrease in the liability. The following entry would be made:

Annuity Payable	$7811.98	
Interest	2188.02	
Cash		$10,000.00

The second payment would be recorded as follows:

Annuity payable	$8007.28	
Interest	1992.72	
Cash		$10,000.00

The entries for each subsequent payment would be determined from the table; the amount in column (3), a credit to Cash; the amount in column (4) a debit to Interest; and the amount in column (5) a debit to Annuity Payable.

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If it is desired for any reason to place the original liability at the total amount of the annuity, the entry would be:

Cash	$87,520.64	
Discount on Annuity	12,479.36	
Annuity Payable		$100,000.00

Discount on Annuity in this case is merely an offset or valuation account, offsetting the amount in the liability account. It would be carried on the balance sheet until written down by the entries at each payment. The entries at the first payment would be:

Annuity Payable	$10,000.00	
Cash		$10,000.00
Interest	2,188.02	
Discount on Annuity		2,188.02

These two entries would have the same net effect on the balance sheet and income statement as the one entry under the preceding method. The subsequent entries would be obtained in a similar manner.

The entries on the books of the purchaser would be the reverse of those on the books of the company issuing the annuity. At the date the annuity is acquired the entry would be:

Annuity	$87,520.64	
Cash		$87,520.64

At the first and second payments the entries would be:

Cash	$10,000.00	
Annuity		$7811.98
Interest		2188.02

and:

Cash	$10,000.00	
Annuity		$8007.28
Interest		1992.72

The succeeding entries may easily be determined in the same manner.

Bonds

When a company issues bonds, it gives two promises to pay which are valued separately as has been shown. In case any one of the bond interest payments is passed, the bondholder has the right to foreclose the mortgage which secures the bond and obtain payment for the principal at par. For this reason the par of the

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bond is always carried on the books as the liability until the date of payment. In case a bond is issued for more or less than par, the difference must be carried in an account as an addition to or offset against the par value.

In order to illustrate the treatment of transactions with bonds, the entries will be given for the bond described in the early part of this chapter: first on the books of the company issuing the same; and second, on the books of the purchaser. When the bond was sold on a 5% basis, the amount received was $956.24, and the entry would be:

Cash	$956.24	
Discount on Bonds	43.76	
Bonds		$1,000.00

The amount of the discount is an offset to the bonds which are carried in the balance sheet at par. The discount is part of the interest which *accrues* during the life of the bond as shown in the table on page 117. Frequently the error is made of treating the discount as a loss, either of the year the bonds are issued or of the year in which they are paid, the amount of the annuity payment being taken as the annual interest charge. That this is incorrect is evident from the analysis of the annuity payment. At the first interest payment date the entry would be:

Interest	$23.91	
Cash		$20.00
Discount on Bonds		3.91

The amount charged against Revenue is $23.91 while the amount credited to Cash is only $20.00; this causes $3.91 to be retained in property to make good the additonal loan the bondholder is in effect making at this time. The succeeding entries made according to this analysis would finally reduce the Discount on Bonds to zero, thus insuring that property had been accumulated to equal the original difference between the par value of the bond and the amount received.

The entries on the books of the purchaser would be the reverse of those on the books of the company issuing the bond. At the date the bond was acquired the entry would be:

Bonds	$1,000.00	
Cash		$956.24
Discount on Bonds		43.76

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Discount on Bonds in this case is an offset against the bond asset account, the value of the bond being only $956.24. At the first interest payment date the entry would be:

Cash	$20.00	
Discount on Bonds	3.91	
Interest		$23.91

The debit to Discount on Bonds reduces the amount of the offset account by the difference between the interest *earned,* $23.91, and the actual cash *received,* $20.00. The entries during the life of the bond will reduce the discount on bonds account to zero, showing that the bond asset increases in value from the purchase price to the par value.

When bonds are bought at part the entries cause no difficulties on either the books of the company issuing the same or of the purchaser. The interest entries in each case are the same amounts as the cash payments.

When the bond is sold at a premium the original entry on the books of the issuing company would be:

Cash	$1046.11	
Bonds		$1000.00
Premium on Bonds		46.11

Premium on Bonds represents part of the total liability. It is that part of the principal of the loan which is repaid in the bond interest payments. Frequently the error is made of considering this as a profit on the sale of bonds and it is credited to revenue. When one considers the impossibility of obtaining a profit on a promise to pay the absurdity of this practice is evident.

The entries for the subsequent payments can be obtained from the table on page 118. At the first payment date the entry would be:

Interest	$15.69	
Premium on Bonds	4.31	
Cash		$20.00

This entry opportions the $20.00 expenditure between interest and the return of capital. The subsequent entries would be made in the same manner, and Premium on Bonds would be written off during the life of the bond.

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The entries on the books of the purchaser would again be the reverse of thoes on the books of the company issuing the bond. At the date of the acquisition of the bond the entry would be:

Bonds	$1000.00	
Premium on Bonds	46.11	
Cash		$1046.11

And at the first interest payment date:

Cash	$20.00	
Interest		$15.69
Premium on Bond		4.31

When a bond is bought between interest payment dates, the entries must take into account the facts brought out in the discussion on page 118. The price of the bond purchased on August 1st was $1054.36, made up as follows: (1) par $1000.00; (2) premium May 1st, $44.91; and (3) accrued interest May 1st to August 1st $10.45. All these items will appear on the books of the purchaser as assets on the date of purchase; therefore the entry would be:

Bond	$1000.00	
Premium	44.91	
Accrued Interest	10.45	
Cash		$1054.36

At the first interest payment date, the accrued interest is received together with the interest accruing since August 1st and the premium amortized from May 1st to September 1st. The entry at that time will therefore be:

Cash	$25.00	
Accrued Interest		$10.45
Interest		10.45
Premium on Bond		4.10

An interesting case arises when bonds are sold by a party who originally purchased at a rate other than the rate at which he sells. Suppose that $10,000 5% bonds due June 1, 1926, were on the books at a value of $10,399.09 (a 4½% basis), and were sold on September 1, 1916, for $10,817.57 and accrued interest (at a 4% basis). The amount received is $10,925.75 ($10,817.57 and accrued

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interest for 3 months at 4%). This will include the par of the bonds, the premium, the interest for three months, and the profit on the sale. The entry would be:

Cash	$10,925.75	
Bonds		$10,000.00
Interest (June to Sept. at 4%)		166.99
Premium on Bonds		399.99
Profit on Sale of Bonds		409.67

If the case were reversed and the bonds were on the books at $10,817.57 (on a 4% basis), and were sold at $10,399.09 (on a 4½ basis) and accrued interest; the entry would be:

Cash	$10,516.08	
Loss on Sale of Bonds	409.67	
Bonds		$10,000.00
Premium on Bonds		817.57
Interest(June to Sept. 4%)		108.18

The Loss on Sale of Bonds could be reduced by the Interest $108.18 if both are treated as Revenue accounts, but the actual loss caused by the difference in rates would be $409.67.

Sinking Funds

In the bond contract, a company is sometimes required to place in the hands of a trustee a sum sufficient to retire the principal of the bonds at maturity. This is called a *sinking fund*. The sinking fund may be accumulated out of profits or it may be set aside out of the original capital. In either case the entries would be the same; i. e. a debit to Sinking Fund Assets and a credit to Cash. This entry is made for the purpose of recording the fact that a part of the cash which has been in the treasury as a part of the general fund used for business operations has been placed in a separate fund which may be used only for the definite purpose of retiring bonds. In case the fund is to be accumulated out of profits, a second and entirely independent entry is made debiting Income or Surplus and crediting Sinking Fund Reserve. This entry is for the purpose of transferring a portion of the proprietor's equity from a free surplus account out of which dividends may be declared to another surplus account which must be retained until the bonds are paid.

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This requires the proprietor to forgo the distribution of a sufficient amount of the annual net profits during the life of the bonds to replace the bondholder's investment.

Suppose the contract requires the accumulation of a sinking fund out of profits to retire $10,000.00 20-year bonds; and that it is possible to obtain 4% on the annual contributions to the fund. The amount of the annual contribution ($335.82) may be found by formula (25). A payment of $335.82 is made to the trustee the first year; the entry being:

Sinking Fund Assets	$335.82	
Cash		$335.82

Another entry will be made transferring the same sum to Sinking Fund Reserve:

Surplus	$335.82	
Sinking Fund Reserve		$335.82

During the first year $13.43 will be received as interest on the fund; the entry being:

Cash	$13.43	
Interest		$13.43

At the beginning of the second year, another contribution must be made to the fund equal to the amount charged the first year plus the interest earned on the fund. The entries would be:

Sinking Fund Assets	$349.25	
Cash		$349.25

and,

Surplus	$349.25	
Sinking Fund Reserve		$349.25

The same process will be repeated each year until the bonds mature, at which time the sinking fund assets will be used to pay the bonds; the entry being:

Bonds	$10,000.00	
Sinking Fund Assets		$10,000.00

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This entry closes the Sinking Fund Assets account but leaves the Sinking Fun Reserve with a credit balance of $10,000.00. This account represents part of the proprietor's equity not available for dividends during the life of the bonds, but which now becomes a free surplus to be distributed as desired. The account will have served its purpose, and will be closed by crediting the amount to Surplus; thus:

Sinking Fund Reserve	$10,000.00	
Surplus		$10,000.00

In this illustration it was assumed that the interest on the fund was received first by the corporation and then paid to the trustee. In general practice, however, the trustee receives the interest directly, the corporation paying him only the annuity payment.

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VIII

DEPRECIATION ACCOUNTING

The capital invested in an enterprise is represented in two types of property: (1) assets of a transitory character—such as raw materials, labor power, fuel, etc.; (2) assets of a more permanent character—such as buildings, machinery, etc. On the balance sheet these items are generaly classified as *current* assets and *fixed* asets, respectively. The important characteristic of the current assets from the accounting standpoint is that units of such property are consumed in giving off a single service. Consequently the amount of such property consumed in an accounting period may be easily measured. Thus the number of units of coal consumed may be determined by physical measurement; the *value* expiration may be determined by multiplying the cost per unit by the number of units consumed. Similarly the amount of raw materials or merchandise consumed may be determined by inspection (counting, weighing, measuring); and this amount multiplied by the cost per unit will give the value expiration.

In the case of fixed assets, however, the method of physical measurement cannot be used to determine the amount of capital expired during the accounting period. Such an asset as a building, for example, is used in its *entirety* to furnish a series of similar services usually covering several accounting periods. Suppose a building costs $10,000.00 and will last twenty years; the capital involved is consumed during the life of the building and is an expense of the entire twenty years. What is the capital expiration each year? How shall this amount be treated in the accounts? These questions as applied to all classes of fixed assets, either tangible or intangible, constitute the problem of depreciation. This chapter will be concerned with the second of these questions.

There are two general policies for the treatment of depreciation in the accounts: (1) the *repairs and renewals method;* and (2) the use of *formal depreciation accounts.*

Repairs and Renewals

Because of the difficulties encountered in measuring the actual decline in value of an item of property within a fiscal period, it is sometimes the policy to record this decrease in the expenses only

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when an expenditure of cash for repairs or renewals is made. This was the policy in use by many of the railroads before the Interstate Commerce Commission prescribed uniform accounting methods. It is argued in favor of this method of treating depreciation that in a large property, the repairs and renewals will take place with such regularity that the annual payments will approximate the depreciation on the property as a whole. Thus if a railroad owns 100,000 box cars and the average life is twenty years, then one-twentieth of the total, or 5,000 cars, would wear out each year; and if the property were maintained there would be an annual replacement of 5,000 cars. If the actual depreciation on the entire 100,000 cars could be determined it would amount to approximately the cost of 5,000 cars each year.

A distinction is usually made between repairs and renewals. This distinction involves the definition of a unit of property. When a complete unit is replaced the expenditure is called a *renewal,* but if only a part of a unit is replaced it is considered a *repair.* This is an arbitrary distinction inasmuch as it is difficult to determine just what unit should be adopted in most cases. The unit of the accountant and the operating official might not be the same; thus the accountant considers the entire locomotive as a unit, while the operating official looks upon each locomotive as made up of a number of structural parts, such as boilers, drivers, etc.

Thus an accounting distinction is necessary between repairs and renewals. A repair partially replaces the value of a unit which has been consumed in production. The cost of a repair is charged directly to expense. The repair charge, however, usually takes care of but a small proportion of the actual depreciation which occurs during an accounting period. The entire unit must necessarily be replaced at some date. As one author says: "All machinery is on an irresistible march to the junk heap, and its progress, while it may be delayed, cannot be prevented by repairs."[1]

A property unit may become worn out or decayed to such an extent that the cost of repairing the unit would be so great that it would be more practical to abandon the item and purchase an entirely new unit . Furthermore an item of property which is still in good physical condition may become worthless through *inadequacy* or *obsolescence.* Thus a railroad bridge which is still in good physical condition for performing the service for which it was intended, may become inadequate because of an increase in traffic or a change in the type of commodities carried, necessitating heavier

[1] Hatfield, *Modern Accounting.*

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locomotives. Or, a newly invented piece of machinery may replace an older type which is still in good condition, but is not capable of producing the service as efficiently as the improved type.

When a renewal is made the entire cost of the abandoned property unit should be charged to expense at the time it is replaced. It is often the practice to charge the cost of the *new* item to expense. This practice would be correct only under certain conditions that rarely exist in actual business. It is the duty of the accountant to record the amount of capital invested in the property account and the value of the property consumed in an expense account. If the new property costs the same as the old item, the value of the property consumed equals the cost of the new property; and it is proper to charge this cost to expense. This entry, however, is merely a contraction of two entries. Suppose that a machine that cost $100 is replaced by another machine which costs the same amount. The old machine has been consumed and its value is therefore charged to expense; thus:

Expense	$100	
Machinery		$100

A new machine is purchased and is charged to Machinery:

Machinery	$100	
Cash		$100

It is convenient to contract these entries into one, in which case the debit and credit to Machinery cancel each other and the entry becomes

Expense	$100	
Cash		$100

It the new item costs more than the old, a new condition arises. Suppose that the new machine cost $110. It is the old machine which has been consumed and is therefore chargeable to Expense. The entry would be:

Expense	$100	
Machinery		$100

The amount of new property is $110 and is chargeable to Machinery:

Machinery	$110	
Cash		$110

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This entry may also be contracted into one; which becomes however:

Expense	$100	
Machinery	10	
Cash		$110

It is often urged that if the new item is similar in nature to the one it replaces, the entire cost should be charged to Expense even if it be greater than the cost of the old unit. The new property will perform the same work as the former, and as the physical property has simply been maintained there is no improvement. Two things are being confused when this argument is advanced: (1) *physical* property; and (2) the *value* of physical property. It is true that the manager has the same property to work with that he had before, but the investment in that property has increased. If we accept the argument, we must assume that money values do not change. This is obviously untrue; labor and material prices are continually fluctuating. If the new machine costs more than the old one, it is worth more regardless of how its output compares with that of the old one. The *capital* cost of producing the product with the new machine will be greater than it was formerly.

Suppose the new machine costs $90. In this case the amount of property consumed was $100, and the entry would be:

Expense	$100	
Machinery		$100

The new property costs $90 and the entry placing it on the books would be:

Machinery	$ 90	
Cash		$ 90

If it is desired to combine these entries, the result would be:

Expense	$100	
Machinery		$ 10
Cash		90

The Expense charge in this case exceeds the cash payment. $100 of capital has been consumed in producing a product, the revenue from which has been received. The capital cost of the same kind of product in the future would be less than before.

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The renewal method may be considered adequate only for a property which consists of a large number of units which wear out and are replaced with regularity. The fact that a property is made up of a large number of units, however, is no proof that the items do wear out with any degree of regularity. If all of the property is purchased in one year, and there are 100,000 units, there is no likelihood that the units will be replaced in equal numbers; in fact it is more probable that most of them will be abandoned in the same year. If a finished property costs $100,000, and each unit of property will last just ten years; then if $10,000 is invested each year for ten years, the same amount of property will wear out each succeeding year after the tenth, and the renewal method will take care of depreciation. But suppose that the property is a growing one and that additions are made in unequal amounts; then it is clear that the renewals will fail to occur in equal amounts. Suppose further that the price of the property units were to increase or decrease, then the value of the units abandoned each year would not correspond to the value of the property consumed. To sum up: if the renewal method is to fit any case the following conditions must obtain: (1) the property must be built in equal installments; (2) the life of the units must be the same; (3) the property must be kept at a constant quantity; i. e. there must not be additions unless made in equal installments; (4) the price of the property items must always remain the same. It is practically impossible for a property to approximate such conditions. In any event a test should be made to determine whether the renewals are being made with regularity. This shows that the treatment of depreciation on the renewal basis is inadequate in the vast majority of cases.

Formal Depreciation Accounts

The other policy which may be adopted is the use of formal depreciation accounts. Under this policy, a certain amount is retained from the revenue of each fiscal period to cover the amount of property consumed in the same period. This amount is retained regardless of whether it is needed for actual replacements or not. The sum used is supposed to approximate the value of the property consumed. The various methods of approximating this amount will be discussed in the next chapter. The entries necessary to record the allowance for depreciation will be taken up at this time.

The net income remaining after expenses have been deducted from revenue received from the sale of product is available for proprietary appropriations. The revenue must include a return

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of part of the capital if the business is a profitable one. If the amount of this returned capital is not deducted, the company may be paying dividends out of capital. This is illegal in many states, and is an improvident procedure in any case. In order to prevent such an occurrence, a charge is made to Expense to cover depreciation. This charge will reduce the revenue by the amount of returned capital and will prevent the payment of dividends from capital.

Suppose that a property of $100,000 is obtained through the issue of $100,000 in capital stock. The balance sheet would be:

Property	$100,000	Capital Stock	$1000,000

During the year, revenue was received sufficient to leave $20,000 after all expenses with the exception of depreciation had been deducted. If we assume that the revenue consisted entirely in cash, the balance sheet would be:

Property	$100,000	Capital Stock	$100,000
Cash	20,000	Revenue	20,000
	$120,000		$120,000

The Revenue item cannot be considered as net income because no deduction has been made for the original property consumed in producing that revenue. Suppose that the property has depreciated $10,000; then an entry should be made charging Depreciation Expense and crediting Property; thus:

Depreciation Expense	$10,000	
Property		$10,000

The Depreciation Expense account being closed against Revenue the balance sheet would show:

Property	$ 90,000	Capital Stock	$100,000
Cash	20,000	Net Income	10,000
	$110,000		$110,000

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This shows that there is $10,000 available for dividends; and if a 10% dividend were paid, the balance sheet would be:

Property	$ 90,000	Capital Stock	$ 100,000
Cash	10,000		
	$100,000		$100,000

All of the profits have been distributed to the stockholders and the total original investment remains in the business. It consists of $90,000 in the original form of property and $10,000 which has been converted into cash.

When depreciation is credited to the property account, it is assumed that the property account will show the actual value. If the amount of depreciation has been accurately measured this would be true; but depreciation is an estimate; therefore, the net amount in the property account may not represent actual value. Furthermore it is desirable to show the original cost of the property in the accounts. For these reasons it is customary to credit another account, Reserve for Depreciation, instead of Property when the charge is made to Depreciation Expense. This account is a valuation account representing the amount of depreciation which has been charged to expense to cover the decrease in value of that property which is stated in the property account at cost. It must always be read in connection with the property account. The entry for recording depreciation when a valuation account is used would be:

Depreciation Expense	$10,000	
Reserve for Depreciation		$10,000

and the Balance Sheet would be:

Property	$100,000	Capital Stock	$100,000
Cash	10,000	Reserve for Depreciation	10,000
	$110,000		$110,000

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In order to prevent a misunderstanding as to the nature of the Reserve for Depreciation account, it is sometimes placed on the asset side of the Balance Sheet as a deduction from Property thus:

Property	$ 100,000	Capital Stock	$100,000
Less Reserve for Depreciation	10,000		
	$ 90,000		
Cash	10,000		
	$100,000		$100,000

This shows more clearly the real nature of the account, but it is more convenient to leave it on the liability side of the balance sheet. When left on the liability side, however, it should not be confused with surplus reserves, which are proprietorship items. (See Chapter V.)

Thus far only the entries which prevent the capital from being distributed as income have been shown. In each case, the property so retained was shown in the cash account. The next question that arises is: what should be done with the cash which has been so withheld? It is in this connection that considerable confusion exists. In answering this question, two general types of business will be considered: (1) those dealing in so-called wasting assets; and (2) those which are normally continuous.

Any business which is organized to exploit a mineral deposit or timber land is included in the first class. The bulk of the investment in such a business is in the raw products *in situ;* and the depreciation is measured by the amount of raw products removed. When all of the product is removed, the business ends. Suppose that the business mentioned above were an iron mine, and that the $100,000 is represented by the ore to be extracted. The balance sheet would be:

Mine	$100,000	Capital Stock	$100,000

At the end of the year, after depreciation had been taken into account, it would be:

Mine	$ 100,000	Capital Stock	$ 100,000
Cash	10,000	Reserve for Depreciation	10,000
	$1000,000		$110,000

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The $100,000 cash is not needed in the development of the mine. It is a part of the original investment which has been liberated. One of two things may be done with it. It could be kept in the corporation for the stockholders until the mine is exhausted, and then returned to them; or it could be returned to the stockholders immediately. If it is to be retained for the stockholders, it might be placed in a special fund reserved for that purpose. The entry would be:

Depreciation Fund	$10,000	
Cash		$10,000

The Balance Sheet would then be:

Mine	$ 100,000	Capital Stock	$100,000
Depreciation Fund	10,000	Reserve for Depreciation....	10,000
	$ 100,000		$100,000

The amount reserved for depreciation would be placed in a fund in this manner each year until the mine was exhausted; at which time the Balance Sheet would be:

Mine	$100,000	Capital Stock	$100,000
Depreciation Fund	100,000	Reserve for Depreciation....	100,000
	$200,000		$200,000

The Reserve for Depreciation Account has now served its purpose; and it may be closed against the mine account, the entry being:

Reserve for Depreciation	$100,000	
Mine		$100,000

This leaves the Balance Sheet at this time as follows:

Depreciation Fund	$100,000	Capital Stock	$100,000

The fund will then be given to the stockholders in exchange for their stock certificates and the corporation will be dissolved.

The stockholders might object to this process. After a part of their investment has been liberated from the mine, instead of being returned to them for investment as they see fit they are compelled

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to have it invested for them. Usually the fund is invested in low rate securities, and the capital investment changes from that of a mine, which is highly speculative, to that of a bank or trust business. Inasmuch as the cash is not needed for the success of the mine, it might better be returned to the stockholders. It must be returned as capital, however, and not as profit. It would be proper to cancel some of the stock; in which case the entry would be:

Capital Stock	$10,000	
Cash		$10,000

And the Balance Sheet would be:

Mine	$100,000	Capital Stock	$ 90,000
		Reserve for Depreciation	10,000
	$100,000		$100,000

In this manner the stock would be canceled as the mine is exhausted.

In case it were not expedient to cancel the stock the cash could be distributed to the stockholders on a pro rata basis; in which case the value of the stock would decrease, although the entire issue would remain outstanding. The entry would be:

Capital Returned	$10,000	
Cash		$10,000

The Balance Sheet would then be:

Mine	$100,000	Capital Stock	$100,000
Capital Returned	10,000	Reserve for Depreciation	10,000
	$110,000		$110,000

Here Capital Returned is a valuation account, an offset to the proprietorship item of Capital Stock. When the mine finally becomes exhausted the Balance Sheet will be:

Mine	$100,000	Capital Stock	$100,000
Capital Returned	100,000	Reserve for Depreciation	100,000
	$200,000		$200,000

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The mine account will be cancelled by a charge to the Reserve for Depreciation account and Capital Stock will be cancelled by a credit to the Capital Returned account. The corporation will then be dissolved.

The policy of ignoring depreciation altogether, which is practiced by many companies, and which causes the stockholder to receive both profits and capital in one dividend check, is obviously improper, and can easily be prevented by proper accounting.

The second type of business is that which is engaged in an industry which is continuous; such as a factory or a railroad. The original stockholders invest with the intention of leaving the capital in the industry for all time—withdrawing only the actual profits. Therefore, the amount withheld from revenue by the charge for depreciation will normally be kept in the business. If this sum is needed only to replace the particular item for which the charge to Depreciation Expense was made, the amount will necessarily be kept in a special fund. Suppose that under these conditions an investment of $100,000 is made in a property. The balance sheet would be:

Property	$100,000	Capital Stock	$100,000

If the amount of depreciation for the year were $10,000 and all profits had been paid in dividends, the resulting balance sheet would be:

Property	$100,000	Capital Stock	$100,000
Cash	10,000	Reserve for Depreciation	10,000
	$110,000		$110,000

The cash may now be placed in a fund to be used for replacing the property when it is exhausted; the balance sheet would then appear:

Property	$100,000	Capital Stock	$100,000
Depreciation Fund	10,000	Reserve for Depreciation	10,000
	$110,000		$110,000

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When the property has expired the fund will have accumulated to $100,000, and the Reserve for Depreciation will be equal to the original cost of the property. The balance sheet would show:

Property	$100,000	Capital Stock	$100,000
Depreciation Fund	100,000	Reserve for Depreciation	100,000
	$200,000		$200,000

The property being worthless, it should be written off the books at this time by the following entry:[2]

Reserve for Depreciation	$100,000	
Property		$100,000

The Depreciation Fund would then be used to replace the old property; then entry being:

Property	$100,000	
Depreciation Fund		$100,000

The balance sheet would then show the original facts:

Property	$100,000	Capital Stock	$100,000

Very few properties are of the sort just described. Most exterprises are continually developing and are in need of capital for extensions at all times. If a depreciation fund were maintained in such a case it would mean that the assets involved would produce a lower rate of return than if used for extensions and general business purposes. The important consideration in taking care of depreciation is the charge to expense. The disposition of the assets retained by this charge is a matter of less significance. If the cash were put into extensions or new property, the balance sheet at the end of the first year would show:

Old Property	$100,000	Capital Stock	$100,000
New Property	10,000	Reserve for Depreciation	10,000
	$110,000		$110,000

[2] If the property consists in a number of units, or is represented by several accounts a charge is made to Reserve for Depreciation and a credit to the proper asset account, whenever an item of property is abandoned.

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At the time the old property wears out, the balance sheet would show:

Old Property	$100,000	Capital Stock	$100,000
New Property	100,000	Reserve for Depreciation	100,000
	$200,000		$200,000

After the old property is abandoned the balance sheet would be:

New Property	$100,000	Capital Stock	$100,000

Assuming that it is necessary to replace property in order to continue business operation, it will be necessary at this time to raise new capital to replace the property abandoned. It would be entirely proper to borrow the funds for this purpose, because all of the old capital is still intact represented in the new property. If this procedure were followed the balance sheet would be:

Property (all new)	$200,000	Capital Stock	$100,000
		Bonds	100,000
	$200,000		$200,000

The case illustrated is the most common. A factory is always in need of new machines, a railroad in need of new cars, sidetracks, etc. This is the best use that can be made of the available funds, because they will usually be more productive if used in the enterprise itself than if placed in special funds or invested in securities bearing a low rate of interest.

Because of the confusion which frequently arises in discussing the terms; Depreciation Expense, Reserve for Depreciation, and Depreciation Fund, the distinction between these terms which has been brought out in the preceding pages will be repeated in summary form. In order that depreciation may be properly accounted for as it occurs, a charge is made to Depreciation Expense, which account is closed into Expense and Revenue. Property may be credited when Depreciation Expense is charged, thus reducing the property account balance; or an entirely different account called Reserve for Depreciation may be credited. This account represents the estimated amount of accrued depreciation on the property carried on the books at cost. Inasmuch as the charge to Depreciation Expense involves neither a concurrent expenditure of cash (or other current assets) nor the assumption of a liability, there will be a sum of cash (or other current assets) equal to the amount so charged

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obtained from revenue. This amount may be disposed of in one of three ways: (1) it may be placed in a special fund; (2) it may be returned to the stockholder as capital; (3) it may be reinvested in the property. If it is placed in a special fund, it will be shown in a Depreciation Fund account; which will appear on the asset side of the balance sheet.

Thus it is clear that the Reserve for Depreciation and the Depreciation Fund accounts are entirely independent. Either may appear on a balance sheeet without the other; or both accounts may appear but not necessarily equal in amount. Indeed, it is entirely possible for a Depreciation Fund to appear on the balance sheet without a charge having been made to Depreciation Expense, provided there is sufficient cash on hand; but in such a case depreciation would not have been properly accounted for.[3]

Thus far it has been assumed that the amount of depreciation can be accurately measured. Quite often it is found that the estimate is incorrect by a large amount. It becomes necessary at such a time to make the proper corrections. All such corrections should be made through the Surplus accounts in order to restate the proprietorship as it should be. If the estimate has been too high, then the profits have been understated by the amount of error; an entry will be made debiting Reserve for Depreciation and crediting Surplus. On the other hand if the estimate has been too low, then profits have been overstated and Surplus is overstated; an entry will be made debiting Surplus and crediting Reserve for Depreciation.

The question as to how depreciation is handled in the accounts is of importance in connection with the regulation of the rates of public utilities by the federal and state governments. Although it is

[3] The common confusion on this point is well illustrated by the accounting of a small telephone company in the state of New York several years ago when the requirement that such companies charge depreciation was first introduced. This company's annual statement showed a "Depreciation Reserve" on the asset side deposited with the savings bank and drawing perhaps 3% interest. Among the liabilities appeared notes payable to almost the exact amount of the fund. On these notes the company was paying 6%. When asked by the statistician of the commission why it did not take the money deposited with the savings bank and pay its outstanding notes, the company replied that the commission's requirement that the company set up a depreciation reserve would not permit this. Since the company had not other cash to put into the reserve, it had, in fact, issued these notes to get the cash with which to create the reserve. This company had not charged depreciation at all. Its earnings for the year were not reduced by a charge to operating expenses for this item.

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not our intention to go into this question in detail, it is well worth noting how the accounting methods enter into the controversy. A rate must be high enough to yield a "reasonable return on the fair value of the property." The "fair value" is generaly taken to mean the cost of reproduction less accrued depreciation.

Having in mind the fact that the stockholders expect a return on the entire capital *invested* in the property, it will be well to inquire how their interests will be affected. It is impossible to keep all the items of property in the original condition. Every item is gradually becoming worthless from the time it is first put into service. The property as a whole therefore will never be in 100% value condition although it may be at the highest point of efficiency. If the renewal method of accounting for depreciation is in use, and is applicable to the business, there will be an equal amount of property in each stage of condition from new to worthless. The condition of the property as a whole would therefore be but 50% of cost, although it would be kept at the highest point of efficiency. A valuation would show the "fair value" as defined to be 50% of the actual investment. A rate based on this value would yield a return on 50% of the amount invested. The defense of this method is that the other 50% of the investment must have been returned to the stockholders in the profits, and that there is only 50% of the investment left in the plant. In so far as depreciation was not charged in the years during which the property was reduced 50%, the surplus for those years was overstated and the claim is theoretically correct. The normal condition of such a property is said to be 50%. This is a further illustration of the inadequacy of the renewal method of accounting for depreciation. The investment of the stockholders is not kept intact, but is decreased through failure to recognize depreciation as it occurs.

If the formal depreciation account method were in use, a different conditon arises. When a Depreciation Fund is maintained, the difference between the original cost and the depreciated value is in this fund. It has not been returned to the stockholders, but is earning a lower rate of return than the part which remains in the property. When the fund is invested in additions to the property, however, the depreciation on all of the property in use deducted from the original cost of such property will leave as a result the actual investment. There can be no controversy in this case regarding the propriety of deducting depreciation to obtain fair value.

The problem of measuring the amount of depreciation during any given period is independent of the treatment in the accounts and will be discussed in the next chapter.

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IX

THE MEASURE OF DEPRECIATION

The purpose of formal depreciation accounts is two-fold: first, to keep the book value of the property equal to the actual value as nearly as may be estimated; and second, to prevent the figure of net income from being incorrectly stated through failure to enter the actual cost of capital consumed in the expense accounts. One journal entry serves both purposes, but should be considered in determining the amount of depreciation in a given period. Frequently the claim is made that it is unnecessary for the property accounts to reflect the actual value at intermediate dates between purchase and replacement, and that sufficient account has been taken of depreciation if assets equal to the original cost of each property item are retained from revenue during the life of the item. If this were all that is necessary, the question of measuring depreciation would be of minor importance, for even the repairs and renewal method would be adequate from this standpoint. As has been previously stated, however, one of the purposes of accounting is to represent the values of property items, and charges in those values must be recorded as they occur if this purpose is to be served.

The problem of measuring depreciation, however, is not entirely an accounting question. The operating official or the valuation engineer must supply the data from which the *service life* of physical property items may be determined. The kind of data necessary depends upon the type of asset which is being considered. The tangible assets present the most varied conditions, and hence the most difficult problems in measuring depreciation arise in connection with these items.

A property unit does not depreciate according to any fixed or uniform rule. It is impossible to forecast accurately the useful life of most items. Depreciation due to certain elements, however, can be estimated. The deterioration due to wear and tear in use, and to decay, may be estimated with a reasonable degree of accuracy. The operating official is able to determine the effect of these elements on the productive efficiency of a unit, and can approximate the date at which it would be unprofitable to keep the item in service—assuming market conditions remain the same. Such

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an estimate would be of service in determining the life of property which depreciates from these causes only. As an aid to making estimates of this sort, tables are often prepared from past experience similar to the mortality tables used in estimating the lives of individuals. Such items as freight cars are generally kept in service until entirely depreciated from physical causes. Tables showing the average life of such equipment under different operating and climatic conditions may well be used for estimating the life of new equipment to be used under similar conditions.

A large proportion of the physical property of most enterprises, however, becomes worthless long before the elements of wear and decay, have caused the items to become inefficient. Invention, discovery, scientific development, public regulation, and changes in the character of demand, often cause property which is in good physical condition to become worthless. It is difficult to forecast the date when one or more of these elements will cause an item to become obsolete or inadequate for further service. Business judgment, however, may be called upon to furnish a fairly reasonable estimate of the service life of items which may be affected by these causes, using past experience as a criterion.

Thus it is seen that the service life of a property unit may be estimated only on the basis of previous experience with the same types of property. Even when the service life has been estimated, there is still the problem of determining the amount of depreciation which accrues in each accounting period during the life of the item. This is made especially difficult by the fact that a part of the depreciation is made good by expenditures for repairs at various times. It is customary to treat depreciation in two parts: the part made good by repairs being charged to expense when the expenditure is made; the amount necessary to replace the original unit being represented by the formal depreciation charges. This is in effect a combination of the repairs and renewals method with the formal depreciation account method. This is done merely as a matter of convenience, and is not strictly in accord with the theory of depreciation accounting. Repairs are seldom made uniformly during succeeding accounting periods. In fact it often happens that no repairs are necessary for several periods, and then extensive expenditures are made. When depreciation is treated as distinct from the repair costs, it often happens that the sum of the repair and depreciation charges to expense in an accounting period will exceed the income from the asset during that period. Such charges distribute the burden of depreciation in the income statement in an inequitable manner. When repairs con-

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stitute a small item in proportion to the total depreciation charge, however, it is practicable to treat them separately.

There are a great many methods of measuring depreciation; but there are only a few which have distinctive features and these will be discussed in the following pages.

Straight Line Method

Under the *straight line method* of measuring depreciation it is assumed that a property item loses an equal amount of value during each year of its service life. The total depreciation is found by deducting the estimated salvage value from the original cost. The total depreciation divided by the estimated life in years, gives the annual depreciation charge. Thus if a machine cost $100, and it is estimated that the salvage value will be $5 at the end of ten years; the total depreciation will be $95, and the annual charge for depreciation will be $9.50.

This method spreads the total depreciation charge evenly over the *life* of the item, but does not give an even rate of income on the investment. This point may best be brought out by an illustration. Suppose that the machine mentioned above will produce $12.55 each year during the ten years it is in service. Each year a charge of $9.50 for depreciation will be made against revenue, leaving a net income of $3.05. The following table shows the book value, revenue, depreciation, net income, and percent of net income to book value, for each year during the life of the machine..

(1)	(2)	(3)	(4)	(5)	(6)
Year	Book value	Revenue	Depreciation	Net income	% Net income to book value
1	$100.00	$12.55	$9.50	$3.05	3.05%
2	90.50	12.55	9.50	3.05	3.37
3	81.00	12.55	9.50	3.05	3.76
4	71.50	12.55	9.50	3.05	4.27
5	62.00	12.55	9.50	3.05	4.92
6	52.50	12.55	9.50	3.05	5.81
7	43.00	12.55	9.50	3.05	7.09
8	33.50	12.55	9.50	3.05	9.10
9	24.00	12.55	9.50	3.05	12.71
10	14.50	12.55	9.50	3.05	21.03
Salvage	5.00				
			95.00		

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Column (6) of this table represents the percent of net income to the book value of the machine. It will be noticed that this percent increases each year. Since the charge to depreciation retains a sum of assets in the business equal to the decline in value of the machine, and assuming that these assets produce the same rate of income as the original machine, the figures in column (6) also represent the percent of total net income to the investment.

This illustration shows that when depreciation is charged on the straight line method and the revenue from the property item is uniform, the rate of return on the investment increases. In this case it increased from 3.05% the first year to 21.03% the tenth. If the market rate of interest were 5%, it would mean that the machine were an unprofitable investment during the first five years and earned exceptionally large return during the last five years. That such a condition could exist is unreasonable. The machine would not have been purchased if it were incapable of earning 5% during half of its service life.

Furthermore the figures in column (2) do not represent the actual value of the property item if income is taken as a basis for value. Thus the straight line method is inadequate for either of the two purposes; the book value of property does not represent the actual value and net income is incorrectly stated. This method is used perhaps more frequently than any other due to its simplicity. In cases where income fluctuates from year to year it is likely to present as accurate figures as most other methods.

Sinking Fund Method

Under the *sinking fund* method, the amount of the annual charge to Depreciation Expense is an annuity which will accumulate at a given rate of interest to the cost less salvage value of the property item at the time it is abandoned. For an illustration of this method we will take the case of the machine mentioned above. The amount of the annuity payment which will accumulate to $95 in ten years may be obtained from formula (25) in Chapter VII. With an interest rate of 5% this would be $7.55. This amount will be charged to Depreciation expense each year and the same amount will be placed in a fund which will accumulate at the rate of 5%. The following table shows the book value, revenue, depreciation, net income, and percent of net income to book value, for each year when the sinking fund method is used.

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(1)	(2)	(3)	(4)	(5) Depreciation	(6)	(7)	(8)
Year	Book value	Revenue	Annuity payment	Interest	Total	Net income	Net income to book value
1	$100.00	$12.55	$7.55	$0.00	$7.55	$5.00	5%
2	92.45	12.55	7.55	.38	7.93	4.62	5
3	84.52	12.55	7.55	.78	8.33	4.22	5
4	76.19	12.55	7.55	1.19	8.74	3.81	5
5	67.45	12.55	7.55	1.63	9.18	3.37	5
6	58.27	12.55	7.55	2.09	9.64	2.91	5
7	48.63	12.55	7.55	2.57	10.12	2.43	5
8	38.51	12.55	7.55	3.08	10.63	1.92	5
9	27.88	12.55	7.55	3.61	11.16	1.39	5
10	16.72	12.55	7.55	4.17	11.72	.83	5
Salvage	5.00		$75.50	$19.50	$95.00		

The entries the first year would be:

Depreciation Expense	$7.55	
Reserve for Depreciation		$7.55

and,

Depreciation Fund	$7.55	
Cash		$7.55

The second and each succeeding year the same entries would be made. Interest is earned on the fund each year; the second year it amounts to $.38. The entry for this year would be:

Depreciation Fund	$ .38	
Reserve for Depreciation		$ .38

It will be noticed that the total amount charged to Depreciation Expense is $75.50 while the total depreciation is $95.00. The difference is the interest which accumulates in the Depreciation Fund. Because the amount charged to Depreciation Expense is less than the total depreciation, it is sometimes argued that under the sinking fund method it is unnecessary to burden the income with the whole cost of the property item. The fallacy in this argument lies in the fact that the interest ($19.50), although a revenue, is not credited to a revenue account, but is credited directly to the valuation account Reservation for Depreciation. The failure to credit the interest to a revenue account has the same effect on net income as

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though the interest were first credited to revenue and then a charge made to expense for the same amount. The actual burden on the income for each year therefore is the amount appearing in column (6).

Under the conditions assumed in the illustration, the rate of return on the book value is the same for each year. Furthermore the book value for each year represents the capitalized value of the future incomes. The conclusion which may be drawn from this is, that when the income is uniform, and the rate of interest on the fund and the rate used in capitalizing the income are the same, the sinking fund method produces accurate results for both book value and the statement of net income. If the fund is not capable as the rate of earning the same rate as the rate at which the income is capitalized this method is not entirely accurate from this standpoint, but is more nearly accurate than the straight line method.

Equal Annual Payment Method

The valuation committee of the American Society of Civil Engineers has given the name *equal annual payment* to a method which has the same effect on net income as the sinking fund method, but the entries for which are somewhat different. The amount of the charge to Depreciation Expense the first year is the same as under the sinking fund method; the charge for the second year is the same as the first plus the amount of interest which would accumulate on the first payment. The same process would be repeated each year. Whatever revenue is earned on the assets retained by the depreciation charge, is credited to revenue. The actual charges to depreciation expense therefore are the same as those shown in the total depreciation column in the last illustration. The entries for depreciation under the equal annual payment method for the first and second years would be:

Depreciation Expense	$7.55	
Reserve for Depreciation		$7.55

and,

Depreciation Expense	$7.93	
Reserve for Depreciation		$7.93

The book value and the burden on the income for each year are the same as under the sinking fund method at the same rates of interest. Under the equal annual payment method, a special fund is seldom maintained, but the assets are kept in the business. The sums withheld from revenue, therefore, will earn at the same

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rate as the property as a whole; and if the income is uniform, this method will produce accurate results.

The Annuity Method

Under the *annuity* method an annual charge is made to Depreciation Expense sufficient to acumulate a sum equal to the cost less the salvage of the original property at the time it is abandoned, plus interest on the amount remaining in the investment each year. Thus if the original cost is $100 and at the end of ten years the scrap value is $5, the amount of the annuity which will accumulate to $95 is $7.55, according to the sinking fund method. Interest at 5% on the declining book value will be added to the depreciation charge each year. The interest on the investment will become smaller each year, while the interest on the accumulation will increase, making the annual charge uniform. The following table shows the book value, interest on the book value, actual depreciation, and the total amount charged to Depreciation Expense, for each year:

(1) Year	(2) Book value	(3) Interest on book value	(4) Depreciation	(5) Depreciation Expense charge (3)+(4)
1	$100.00	$5.00	$7.55	$12.55
2	92.45	4.62	7.93	12.55
3	84.45	4.22	8.33	12.55
4	76.19	3.81	8.74	12.55
5	67.45	3.37	9.18	12.55
6	58.27	2.91	9.64	12.55
7	48.63	2.43	10.12	12.55
8	38.51	1.92	10.63	12.55
9	27.88	1.39	11.16	12.55
10	16.72	.83	11.72	12.55
Salvage	5.00			
			95.00	

The entry for recording depreciation the first year would be:

Depreciation Expense	$12.55	
Reserve for Depreciation		$7.55
Interest		5.00

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Each year Depreciation Expense would be charged with $12.55, the Reserve for Depreciation would be credited with the amounts shown in column (4), and Interest would be credited with the amounts shown in column (3). A larger amount is charged to Depreciation Expense each year under the annuity method than under the sinking fund method, but the difference betwen the two amounts is immediately credited to Interest, therefore the net effect on income and the book value of the property is the same under both methods.

It is a debatable question as to whether any purpose is served through the use of the annuity method as compared with the sinking fund method. Surely as far as the effect on the Income statement and Balance Sheet is concerned the methods are identical. The charging of interest on the investment in the Depreciation Expense account, however, serves to make that account reflect the total capital cost of production. The amount so charged is similar to the amount paid for the rent of a building. Such a payment includes depreciation and also interest on the investment. In the case of the annuity method of writing off depreciation, the amount of interest is credited to the proprietor. The Depreciation Expense account can be used in cost accounting in determining the relative costs of different processes of production. In order to be consistent interest should be charged to the expense account for this purpose on all capital employed in production including the circulating capital for which depreciation accounts are not kept. The question as to whether interest on the investment should be included in the expense account being independent of the depreciation problem, the annuity method must be considered as another phase of the sinking fund method.

Fixed Percentage of Declining Value Method

The methods so far discussed have disregarded the cost of repairs entirely. The repair costs under each method are charged to expense at the time the repairs are made. Several methods are employed which atempt to unite the two charges for depreciation and repairs on a uniform basis. The *fixed percentage of declining value* method is based on the supposition that the repair costs increase each year. The repairs are charged to expense at the time they are made but the depreciation charge decreases each year. A purely arbitrary rule is adopted for scaling down the depreciation charges. A rate percent is found which applied to the decreasing balance in the property account will reduce that account from cost to salvage value. The formula for finding this rate would be obtained from

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the following: Let V_1 represent the original cost, V_2 the salvage value, r the rate which applied to the declining value will reduce the item from V_1 to V_2, and n the number of years; then:

$$V_1\ (1-r)\ (1-r)\ (1-r)\ \text{(etc. for n terms)} = V_2, \text{ or}$$

$$V_1\ (1-r)^n = V_2$$

$$\text{Hence, } r = 1 - \left(\frac{V_2}{V_1}\right)^{1/n}$$

This formula cannot be solved when $V_2 = 0$, which means that it is serviceable only when there is a salvage value. This method is at best an arbitrary scheme of charging depreciation. No test is made to determine whether repairs do increase at the same rate as the depreciation charges decrease. In fact it is improbable that the repairs would occur in such an increasing series. Suppose that a machine which originally cost $100 will last ten years and will have a scrap value of $5.25; and that the total cost of repairs during the life of the machine will be $67. If the rate of interest is 5%, it would be profitable to invest in this machine if it produced $21.63 a year for ten years before deductions are made for repairs or depreciation, even if all the repairs were made the first year[1] Using the formula developed above, the rate of repreciation on declining value would be 25.51%. The following table represents the book value and the annual depreciation charge.

(1) Year	(2) Book Value	(3) Depreciation (25.51% book value)
1	$100.00	$25.51
2	74.49	19.00
3	55.49	14.16
4	41.33	10.54
5	30.79	7.86
6	22.93	5.85
7	17.08	4.36
8	12.72	3.25
9	9.47	2.42
10	1.05	1.80
Salvage	5.25	
		$94.75

[1] $21.63 represents the ten-year annuity which $167 will purchase at 5%.

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Assuming a revenue of $21.63, this shows that the machine actually loses $3.88 the first year entirely irrespective of repairs. Furthermore, according to the theory that repairs increase at the same rate that the depreciation charges decrease, the total annual charge for repairs and depreciation would necessarily be $25.51, causing a loss of $3.88 every year. This is impossible according to the conditions assumed. Therefore the fixed percentage of declining value method does not attain the purpose for which it is intended. The longer the life of an item, the more nearly it will approximate the actual conditions; but the longer the life, the more nearly the method will approximate the straight line method.

Repairs and Depreciation Reserve Method

The repairs are more likely to occur in uneven amounts during the service life of a property item than in a regularly increasing series as is assumed under the fixed percentage of declining value method. A machine will require only minor repairs for a period of years and then will require a general overhauling necessitating heavy expenditures in one year. It will then require but minor repairs for another period of years. It is true that these minor repairs may be made more frequently in later periods than in the earlier years, and will therefore increase the repair expenditure in those years; but it is evident that the annual repair charges will not normally increase in a regular series. If the repair and depreciation charges are to be united into a uniform charge, the scientific procedure would be to spread the cost of all repairs on a uniform basis similar to the depreciatioin of the original cost. It might be considered that the total cost of the property item consists of the purchase price plus the repair costs, and that the total cost must be amortized through depreciation charges. This may be attempted by the *repair and depreciation reserve* method. Under this method, a charge is made to Depreciation Expense each year, and a credit is made to Reserve for Depreciation, which is sufficient to take care of both repairs and renewals. Then repairs and renewals are both charged against the Reserve for Depreciation at the time the expenditures are incurred or the property item abandoned.

Suppose that the original cost of a machine is $100, and that the repairs for the first five years are as follows: 1st, $0; 2nd, $2; 3rd, $1; 4th, $1; and 5th, $5. Then in the sixth year it becomes necessary to overhaul the machine at a cost of $25. The repair costs of the remaining four years are as follows: 7th, $5; 8th, $6; 9th, $10; and 10th, $12. The total cost as defined above would be

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$167.00. This amount should be amortized in the depreciation charges. If the straight line method is used, the following table would represent the book value, depreciation charge, the repairs charged against the Reserve for Depreciation, and the balance remaining in the Reserve for Depreciation, at the end of each year:

(1) Year	(2) Book value (beginning of year)	(3) Depreciation charge	(4) Repairs charged against	(5) Balance in Reserve for Depreciation at end of year
1	$100.00	$16.70	$0.00	$16.70
2	83.30	16.70	2.00	31.40
3	68.60	16.70	1.00	47.10
4	52.90	16.70	1.00	62.80
5	37.20	16.70	5.00	74.50
6	25.50	16.70	25.00	66.20
7	33.80	16.70	5.00	77.90
8	22.10	16.70	6.00	88.60
9	11.40	16.70	10.00	95.30
10	4.70	16.70	12.00	100.00
		$167.00	$67.00	

The book value of the machine at the beginning of the seventh year is greater than at the beginning of the sixth year, for it would have a greater actual value after it had been overhauled at an expense of $25. If it were not worth more at that time, the $25 expenditure would have been ill-advised. The charge to expense for depreciation would be the same each year, regardless of the amount of repairs.

It has been assumed in all the illustrations thus far that the revenue produced with a property item is uniform. This is rarely the case, however; the revenue will invariably fluctuate from year to year and will generally decrease in the later part of the life of the item. The income from the machine in the foregoing illustration might be somewhat as follows: 1st year, $22.15; 2nd, $22.15; 3rd, $21.20; 4th, $20.90; 5th, $20.60; 6th, $19.75; 7th, $16.05; 8th, $15.45; 9th, $14.80; and 10th, $13.90. The tenth year it is impossible to obtain more than $13.90 in spite of the heavy repairs made in that year. It is because of this fact that it becomes necessary to abandon the machine. If the straight line method of writing off

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repairs and depreciation is used, the following table shows the net income and the percent of net income to book value:

(1) Year	(2) Book value	(3) Revenue	(4) Depreciation charge	(5) Net income	(6) % Net income to book value
1	$100.00	$22.15	$16.70	$5.45	5.45%
2	83.30	22.15	16.70	5.45	5.45
3	68.60	21.20	16.70	4.50	6.56
4	52.90	20.90	16.70	4.20	7.94
5	37.20	20.60	16.70	3.90	10.48
6	25.50	19.75	16.70	3.05	11.96
7	33.80	16.05	16.70	— .65	— 1.92
8	22.10	15.45	16.70	—1.25	— 5.66
9	11.40	14.80	16.70	—1.90	—16.66
10	4.70	13.90	16.70	—2.80	—59.57

This shows that the straight line method does not give correct results for net income when used in connection with a decreasing revenue. If the revenue were uniform or increased, the resulting net income would be more nearly an equal percentage of the book value.

If the sinking fund method were applied to the same series of incomes, more accurate results would be obtained. It would be necessary to find the amount which would accumulate to the cost of each repair at the time it is made. The figures would be as follows:

(1) Year	(2) Book value	(3) Revenue	(4) Depreciation charge	(5) Net income	(6) % Net income to book value
1	$100.00	$22.15	$17.16	$4.99	4.99%
2	82.84	22.15	18.02	4.13	4.98
3	66.82	21.20	17.84	3.36	5.02
4	49.98	20.90	18.37	2.53	5.06
5	32.61	20.60	19.00	1.60	5.06
6	18.61	19.75	18.80	.95	5.10
7	24.81	16.05	14.81	1.24	4.99
8	15.00	15.45	14.69	.76	5.06
9	6.31	14.80	14.50	.30	4.75
10	1.81	13.90	13.81	.09	4.97
			$167.00		

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Thus it is seen that if the incomes decrease and the sinking fund method of charging repairs and depreciation is used, a more even return on the investment results than under the straight line method.

Capitalization of Future Revenue Method

Another method of measuring depreciation is based on the assumption that the value of a property item used in production is determined by the revenue which it will produce. That is, if a machine will produce $100 a year for five years after all expenses except depreciation have been deducted, and the rate of interest is 5%, it will have a value of $432.95. Under the *capitalization of future revenue* method, the future revenue to be derived from a property item is capitalized at the beginning and end of an accounting period, and the difference between the two amounts is the depreciation charge. This method regards a property item as the present value of a series of incomes. This is similar to the method of valuing annuities and bonds. The peculiarities of this method may best be brought out by illustration. Suppose that a machine will give off the following incomes: 1st year, $25; 2nd, $25; 3rd, $20; 4th, $20; 5th, 0; 6th, $18; 7th, $18; 8th, $14; 9th, $14; and 10th, $12; and the salvage value, $10. If the purchase is made on a 5% basis, the price would be $138.45. The depreciation would be found by revaluing the incomes each year. The following table represents the book value, revenue, depreciation, net income, and percent of net income to book value, for each year:

(1) Year	(2) Book value	(3) Revenue	(4) Depreciation charge	(5) Net income	(6) % Net income to book value
1	$138.45	$25.00	$18.07	$6.93	5.%
2	120.38	25.00	18.99	6.01	5.
3	101.39	20.00	14.92	5.08	5.
4	86.47	20.00	15.69	4.31	5.
5	70.78	0.00	— 3.54	3.54	5.
6	74.32	18.00	14.29	3.71	5.
7	60.03	18.00	14.99	3.01	5.
8	45.04	14.00	11.76	2.24	5.
9	33.28	14.00	12.33	1.67	5.
10	20.95	12.00	20.95	1.05	5.
Salvage		10.00			

It should be noted that in the fifth year there is no income and that during that year the property appreciates by $3.54, and this gives a return of 5% on the investment. It would seem that to increase the

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property valuation during a year when there is no income is improper. but if we accept the assumption that the value is determined by the future incomes, the property *actually* appreciates during the fifth year. There are five remaining incomes at the beginning of the fifth year, the same five incomes are remaining at the end of the fifth year, but are all one year nearer and are therefore more valuable.

In this case we have assumed a variable revenue; if the revenue were constant this method would be identical with the sinking fund method.

Depreciation as a Function of Profits

The fact that the capitalization of future revenue method produces an even flow of income providing the investment remains intact is the basis for an argument in favor of charging depreciation as a function of profits. This method has been in use by many different enterprises, but has condemned by accountants generally because it implies that in the absence of profits, no depreciation should be charged. One argument against the charging of depreciation as a function of profits, is the likelihood of the use of this method to cover up the earnings of a poor year—in this way allowing the manager to "make a showing." This objection is not valid because the operating sheet will show the decline in gross revenues even though the depreciation charge be small or nil. An important argument in favor of this method is the fact that an even flow of income is desirable from the standpoint of security holders.

This method may be applied in various ways in practice. A certain amount may be charged per unit of product or per dollar of gross or net income. The railways formerly resorted to the practice of charging an arbitrary sum to expense during a year of large earnings and none in years when the earnings were low. This practice is not allowed under the present rules of the Interstate Commerce Commission. But inasmuch as it is the practice of railroads to make extensive repairs in the years when revenues are large, and to make few repairs in lean years, the total charge for depreciation does in fact vary to some extent with revenue.

Miscellaneous Methods

There are a great many methods advocated for measuring depreciation which are more or less accurate, but which it is needless to discuss in this chapter. An ingenious method is the one suggested by W. M. Cole in his "Accounting and Auditing." Under this method, a varying fraction of the total depreciation

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is taken each year. The fraction is found by the following method: the denominator is the sum of all the numbers representing the years of life; the numerator for each year is represented by the number of years remaining in the service life. Thus a life of five years would give a denominator of $1+2+3+4+5=15$; the fraction of the total depreciation the first year would be 5/15; the second, 4/15; the third, 3/15, etc.

Several other methods consist of restatements of the sinking fund and equal payment methods. R. H. Whitten in his "Valuation of Public Service Corporations" (Supplement.) advocates the use of what he calls the *uniform investment charge* method, which is a different way of viewing the equal annual payment method. The same is true of the unit cost method.

Depreciation of Intangible Assets

The value of an intangible asset is determined by the income it will produce. (See Chapter X). The difficult problem in connection with such items consists in determining the amount of income derived from the asset and the number of years the incomes will be received. When these two facts are known, the amount of depreciation is easily determined. The value at the beginning of the year is the capitalized value of the future incomes, and the value at the end of the year is the capitalized value of the remaining future incomes. The amount of depreciation is the difference between the two values. The intangible assets do not present the difficult questions which arise in connection with tangible assets because of repairs. If the income from an intangible asset is perpetual, the amount of depreciation for each year is zero.

Summary

Depreciation charges are usually divided into two parts: (1) repairs; (2) formal depreciation charges. There are several methods of estimating the amount of depreciation to be entered in the formal depreciation accounts. The straight line method is the most simple and perhaps the most common in use. This method fails to fulfill the purposes of depreciation accounting when the income is uniform. It gives more nearly accurate results when the income decreases during the life of a property item. The sinking fund method gives accurate results when the income is contant, but is not accurate when the income fluctuates from year to year. There are several other methods which are merely different phases of the sinking fund method, notably, the equal annual payment and the annuity methods. The fixed percentage of declining value method at-

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tempts to equalize the depreciation charges and repair costs throughout the life of a property unit, but fails to accomplish this result in most cases. Another method of equalizing repair and depreciation charges is to maintain a reserve for repairs and depreciation. The question, as to which method of accumulating this reserve is most accurate, depends on whether the incomes are constant or fluctuating. The most accurate method from a theoretical standpoint is the capitalization of future revenues method. This method is difficult to apply in practice because of the impossibility of forecasting revenues accurately. This method supplies an argument for charging depreciation as a function of profits. Finally the proper method of charging depreciation on intangible assets is by capitalizing future incomes.

While this discussion does not attempt to exhaust the subject of depreciation, it has been the purpose to set forth the more important problems in connection with the question.

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X

THE INTANGIBLE ASSETS

It has been shown that property is a category which includes both material and immaterial items. We have seen further that both material and intangible assets can be classified again into *fixed* assets and *current* assets. Examples of current *intangibles* are labor services, capital services, insurance services, etc. These items are accorded similar treatment in the accounts to current tangible assets; such as merchandise, coal, etc. Current assets of both types furnish less difficult questions of accounting analysis than arise in the case of the fixed assets. In the present chapter we shall undertake a brief consideration of the nature and accounting treatment of the fixed intangibles, under the following heads: (1) goodwill; (2) developmental value; (3) miscellaneous intangibles.

Goodwill

The rates of return realized on the capital investment in production vary greatly between different enterprises—even in the same industry. In the manufacture of furniture, for example, one firm will be earning 5% on the investment, another 6%, another 10%, and so on. The conditions of business success are so complex, that the amount of capital invested is only one of the elements determining the amount of the net income. Managerial ability, methods and processes, territorial location, trade names, selling organization; these and many other factors contribute to financial success. Some enterprises posses a superior equipment as compared with their competitors in regard to such factors. The capitalized value of the excess earning which a particular firm is able to realize over a normal firm in the same industry and with the same capital investment, is *goodwill.* By a normal firm is meant an enterprise that is earning a rate of return high enough to attract the investor to the industry in question.

Let us suppose that the A. Co. has $1,000,000 of capital invested, and earns a net income of $70,000 per year. This gives a rate of 7% on the investment, which, we will suppose, is the rate of return necessary to attract capital to this branch of production. It is the return which as entrepreneur must make if he is to be

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considered as financially successful in the field of industry in question. The B. Co. has also invested $1,000,000 in the same industry, but earns $140,000 annually. Now it is evident that the property of the B. Co. and all the conditions that go with it is worth twice as much as the property of the A. Co.; for the final test of the value of any property is its earning power. Hence the property of the second concern is really worth $2,000,000. The principal investment is the same in both cases, but the advantages of the B. Co. are such that it possesses twice the earning power of the other firm. The B. Co. then has an intangible asset due to one or more factors that give it an advantage over the normal firm. Goodwill might be again defined, then as the capitalization of a *differential profit* which a particular firm enjoys.

From the view point that one purpose of the accounts is to show the actual value of the property, it is entirely proper to recognize this item of goodwill and record it on the books as an asset. The entry setting up goodwill in such a case would be:

Goodwill	$1,000,000	
Goodwill Surplus		$1,000,000

It is desirable to credit Goodwill Surplus rather than a general surplus account, for as we shall see, this credit to the proprietor is not one that can be appropriated for dividend purposes. The balance sheet of the B. Co. would now stand as follows:

Invested Property	$1,000,000	Capital Stock	$1,000,000
Goodwill	1,000,000	Goodwill Surplus	1,000,000
	$2,000,000		$2,000,000

It must be recognized that such use of Goodwill as an asset is legitimate only under certain conditions: (1) the necessary competitive return in the industry in question must be ascertained; (2) the excess income upon which goodwill is based must be permanent; that is, it would not be proper to recognize goodwill on the strength of a single abnormal income statement: the permanency of the income in question must be reasonably assured. Under these conditions goodwill is entirely legitimate, but we must be sure that these conditions exist.

Goodwill is most frequently made us of in actual practice to validate security issues. Usually the par value of the securities issued exceeds the value of the property acquired. In such cases

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it is common practice to use Goodwill (or a similar item) on the asset side of the balance sheet. This practice is improper. The goodwill in such a case may be entirely imaginary. As was stated in Chapter VI, Discount on Stock should be used to represent the excess of the par value of stock issued over the value of the property acquired. Frequently some general title such as "Property, goodwill, royalties, etc." is used. This is still more questionable, for no one knows in such a case what is the estimated amount of goodwill.

Often when a partnership or corporation is taken over by another concern, something is paid for goodwill, even though this asset has not been previously recognized on the books of the original concern. If actual property is paid for this asset, then it is entirely proper to list it on the books of the buyer (especially if the purchase took place under competitive conditions); but it should be recorded in a distinct account and for the amount actually paid. Very often the payment made is only nominal, and hence the goodwill is fictitious.

Goodwill is often transferable, as is any asset; and in such a case, it is recorded on the books of the purchaser at cost. Frequently, however, goodwill is dependent upon the personnel of the proprietors. In such a case this asset measures the capital value of the business qualities and characteristics of a certain individual or group of individuals attached to a business enterprise. This situation occurs most frequently in sole-proprietor enterprises and in partnerships. The proprietors in such cases often give a value to their firms because of the personal esteem with which they are regarded by their customers. Or the business may be one which requires peculiar skill, in which case the success of the enterprise depends largely upon the knowledge of the business which the original owners possess. In all such cases it is not possible to transfer goodwill from one business to another unless the change is nominal as far as the personnel of the owners is concerned. When, however, goodwill depends upon a trade name, a copyright, market conditions, secret processes, etc., it is usually possible to transfer the asset from one firm to another.

The later treatment of goodwill in the accounts raises a number of interesting questions. In the case given above, it must be carefully recognized that the surplus created by recognizing goodwill, although a proprietary account, is not available for cash dividend appropriations. The asset which gave rise to this surplus is an intangible, and cannot be used to pay dividends. It is an asset, however, which has earning power, like other property items,

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and hence makes dividends possible. Goodwill Surplus in such a case is similar to the equities representing original investment. It cannot be withdrawn from the business. It would be reasonable, however, to issue a stock dividend for the amount of this surplus.

When the enterprise concerned is a wasting property, then goodwill should be amortized in the same manner as the other property items; for evidently the goodwill will have disappeared when the other property has disappeared. In such a case the charge ot Depreciation Expense will cover the decline in value of goodwill and the other property as well. The analysis of of the accounting treatment of goodwill in such a case is of theoretic interest, and throws some light upon the effect of the recognition of this asset upon the Expense and Revenue statement. Suppose that the B. Co. is a mining enterprise owning a property which cost $1,000,000 and will last twenty years. Suppose further that the necessary competitive return to capital in this industry is 7%; and that the company is reasonably assured of an annual income of $188,800 before deducting depreciation. This gives a property value of $2,000,000. The balance sheet showing this condition would be:

Property (at cost)	$1,000,000	Capital Stock	$1,000,000
Goodwill	1,000,000	Goodwill Surplus	1,000,000
	$2,000,000		$2,000,000

We will suppose depreciation to be taken care of by the sinking fund method, (this being identical with the capitalization of future revenue method when the revenue is constant). In round figures the amount of the sinking fund installment would be $48,800. This amount is charged to Depreciation Expense and credited to Reserve for Depreciation. The following is the Expense and Revenue statement at the end of the first year:

Depreciation Expense	$ 48,800	Total Revenue	$488,800
Other Expense	300,000		
Net Income	140,000		
	$488,800		$488,800

The entire amount of net income is distributed as dividends and the expiration of capital, $48,800, which has been retained from revenue by the charge to Depreciation Expense, is also returned to the

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stockholders. If goodwill had not been entered as an asset, the charge to Depreciation Expense would have been but $24,400; Net Income would appear at $164,000; and but $24,000 of the payment to the stockholders would be a return of capital. The use of goodwill in such a case restricts net income to the necessary return for the proprietor's service as such; all differential profit being considered as the return of the asset, goodwill. The balance sheet after the above transactions would be:

Property (at cost)	$1,000,000	Capital Stock	$1,000,000
Goodwill	1,000,000	Goodwill Surplus	1,000,000
Capital Returned	48,800	Reserve for Depreciation	48,800
	$2,048,800		$2,048,800

The value of the property is now $2,000,000 less the Reserve for Depreciation, or $1,951,200. This amount represents the present value of the nineteen remaining incomes on a 7% basis. The charge to Depreciation Expense the second year is $52,000 (approximately), which represents the difference between the present value of nineteen annual incomes of $188,800 and the present value of eighteen such incomes. The Expense and Revenue statement would be as follows:

Depreciation Expense	$ 52,000	Total Revenue	$488,800
Other Expense	300,000		
Net Income	136,800		
	$488,800		$488,800

The distribution to the stockholders is, as before, $188,800. Each succeeding year the distribution to the stockholders will be $188,800, which is the sum of the annual amortizations of capital and the net income of 7% on the remaining capital value.

If the amount retained from revenue in the above case to replace the expiration of capital had not been returned to the stockholders, but had been retained in a special fund; the result of this procedure would be to replace the intangible asset goodwill with a tangible asset. At the end of twenty years the balance sheet would be:

Property	$1,000,000	Capital Stock	$1,000,000
Goodwill	1,000,000	Goodwill Surplus	1,000,000
Depreciation Fund	2,000,000	Reserve for Depreciation	2,000,000
	$4,000,000		$4,000,000

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Since both property and goodwill are entirely extinguished these items can be written off against the offset account Reserve for Depreciation by the following entry:

Reserve for Depreciation	$2,000,000	
Property		$1,000,000
Goodwill		1,000,000

There is now no reason for considering the surplus originating from goodwill as a special surplus (in fact it might have been gradually transferred to general surplus as goodwill was amortized and replaced by tangible assets). The entry closing this account into Surplus would be:

Goodwill Surplus	$1,000.00	
Surplus		$1,000,000

The balance sheet would now show the following condition:

Depreciation Fund	$2,000,000	Capital Stock	$1,000,000
		Surplus	1,000,000
	$2,000,000		$2,000,000

The business can be liquidated by distributing the $2,000,000 in the Depreciation Fund to the Stockholders.

There are four possible cases involved in this discussion. (1) Goodwill is recognized in the accounts and amortized with the physical property as shown above; the amount of amortization being returned to the stockholders each year together with the net income. In this case $3,776,000 (twenty annual payments of $188,800) is returned to the stockholders during the twenty years, and at the end of the life of the property there are no assets remaining for distribution. (2) Goodwill is not recognized, and only the physical property is amortized. The amount of this amortization is returned ot the stockholders each year together with the net income. In this case, also, the total distribution to the stockholders during the twenty years is $3,776,000. The annual distribution is $188,800. The only difference between (2) and (1) is the different distribution of the annual payment between net income and the return of capital. (3) Goodwill is recognized and amortized as in (1) but the amount of the amortization is set up in a special fund instead of being returned to the stockholders annually. In this case $1,776,000 is returned during the twenty years, and $2,000,000 is returned in a lump sum at the end of the period. (4) The same as (3) except that goodwill is not recognized. In this case the annual

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payments total $2,776,000, and the amount in the special fund ($1,000,000) is returned at the end of the period.

Whenever goodwill depends upon wasting assets such as contracts or leases which cover a definite period, it should be amortized during the life of these instruments.

When goodwill exists in an enterprise which expects to be continuous it need not be amortized providing the rate of income is permanently assured. Or it can be viewed in this way: goodwill in such a case is an asset whose length of life is infinity and hence the annual depreciation charge is zero. If the rate of net income falls, then evidently a certain portion of the goodwill has disappeared. Goodwill should be credited and Goodwill Surplus debited for the amount of goodwill expired. If the goodwill has been purchased and hence no Goodwill Surplus exists, then general surplus should be charged. The point should be emphasized that expirations of goodwill in a continuous business that result through an unforeseen decline in the rate of net income should be charged against some surplus account and not against revenue. If the decline in income is expected, then goodwill can be amortized as is any asset, through depreciation charges against revenue.

Appreciation of goodwill may be taken into account if the rate of profit permanently increases. In practice, however, goodwill is more frequently carried on the books when earnings are low, and is amortized when a surplus has been accumulated. There is little to be said in favor of such procedure; goodwill is recognized when it does not exist, and it is amortized when it does exist. That the accounts should express as nearly as possible the actual situation is the only logical positon.

When one realizes that in certain types of business goodwill forms a large or a major part of the total property, the importance of this asset is emphasized. The goodwill of a metropolitan newspaper, for example, may represent three-fourths of the total value of the enterprise. Such an enterprise usually has a large surplus and ignores goodwill in its financials records. In such a case, however, goodwill is reflected in the market price of the capital stock. For example, the B. Co. shows the following balance sheet:

Property	$7,000,000	Capital Stock	$5,000,000
		Surplus	2,000,000
	$7,000,000		$7,000,000

The capital stock is, as usual, listed at par. We will suppose that on the market this stock sells for $200 per share. Total proprietor-

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ship is shown on the balance sheet at $7,000,000; whereas, according to the market valuation, proprietorship is $10,000,000. The difference, $3,000,000 is really goodwill. If the balance sheet be revised to record the actual situation, we should have:

Property	$7,000,000	Capital Stock	$5,000,000
		Suplus	2,000,000
Goodwill	3,000,000	Goodwill Surplus	3,000,000
	$10,000,000		$10,000,000

To sum up: Goodwill is an intangible asset representing the capitalization of the excess earnings of a particular firm over the normal rate in that line of industry. It is legitimate only when such an excess earning power exists and is reasonably assured for at least a number of years. In the case of a wasting asset enterprise goodwill should be amortized in the same manner as the tangible property. In a continuous business changes in goodwill reflect changes in the earning power. The point should be emphasized that whenever goodwill is recognized in the accounts and no payment is made for the same, the only effect of this procedure is to restrict net income to the normal return on the properietor's service in the industry in question.

Developmental Value

We shall term developmental value what is veriously called pioneering value, experimental value, going value, etc. [1] In the development of a new enterprise a considerable interval elapses

[1] From the time that a business enterprise is originally projected to the time the firm begins to earn a normal return on the investment, a considerable interval usually elapses. This interval may be divided into two periods: (1) the period extending from the time the first steps by the promoter are taken to the time when the concern begins to earn revenue; (2) the period extending from the time when revenue first accrues to the time when a normal return on the investment is realized. Going value, in the strict sense of the term, arises in the first period, development value in the second. There are necessary for the organization of an enterprise: materials, labor services, promoter's services, capital services, underwriter's services, etc. All these factors are essential to the finished plant, ready for operation. The cost of the finished plant over and above the cost in labor and materials constitutes going value. Thus defined, going value represents the amount of the organization expenditures which do not directly enter into the physical plant. The costs of such services according to the analysis in Chapter VI are properly considered as capital charges.

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between the time that revenue actually begins to accrue and the time that a normal rate of income is earned. This is particularly true of industries in which might be called the experimental stage. Many of the electric power companies, for example, failed to realize a normal rate of net income in the early years (in some cases actual losses were suffered). This was due to the lack of a brisk demand for the product, the rapidity of mechanical changes in equipment and the high costs due to inexperienced management. On the theory that the investor is entitled to a fair return on his investment, it is urged that there is in such cases, a developmental value representing the capitalization of the early losses of the enterprise.

This theory is of significance in connection with the regulation of the rates of public utilities. The problem in such cases is to so adjust prices that the investor in such properties will neither be discriminated against nor advantaged as compared with his fellow investor in competitive lines (admitting that the normal return in public utilities may differ because of the nature of the industries involved). If the investor in competitive lines is able to recover pioneering losses, then the investor in public utilities should be allowed to do so. It is argued that in competitive enterprise the investor is able to recompense himself for early losses in later higher prices. If all investors in a certain industry suffered losses (or did not realize the normal return afforded by general business) for a given period, it might seem reasonable to conclude that prices would later he high enough to cover these early losses. Even in such a case this conclusion is doubtful. Once the industry in question becomes established can the early investors charge higher prices because of previous losses? Would not capital flow from other lines into the now established industry and drive prices down to a point at which a normal return was realized? There seems to be little tendency in competitive industry to allow a return on early losses in particular lines. And this seems socially expedient. Suppose, for example, that losses in an industry are due to rapid mechanical improvements which necessitate the abandonment of practically new machinery; if private losses due to these changes were recompensed by higher prices later, the consuming public would realize no benefit from this technical improvement.

The attitude of the investor must be analyzed. In case a regular pioneering period of say five years was expected by the investor in *all* branches of industry probably prices would be high enough later to cover pioneering losses—certainly this would be true if the pioneering periods in all lines were concurrent.

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It is evident that the problem of developmental value is very complex. In certain cases such as an intangible may with reason be allowed. If, for example, the rates prescribed by law have been lower than the rates which would have normally been earned; that is, if the early losses are due to unreasonably low rates, then the investor should be allowed to recover this equity. In any case the mater is a question for judicial opinion. There seems to be sufficient ground for excluding developmental value from the books of account.

Miscellaneous Intangibles

A broad definition of goodwill makes this asset depend upon all the conditions which give a particular firm a differential profit. Certain of these factors are sufficiently definite to be considered as giving rise to distinct assets. We shall give cursory consideration to the more important examples.

Patents

A patent is a grant by the state conferring exclusive privileges in connection with the production and sale of some product for a specified length of time. It gives to the grantee a monopoly to make and sell some invention. The test as to whether a patent constitutes an asset or not, is not its cost, but its earning power, as in any case of goodwill. It may, however, be deemed reasonable to put the patent on the books at the cost of the experiments that gave rise to it, and the clerical fees necessary to secure it, in anticipation of the financial success of the patent. Or when a corporation organizes and buys out an invention, the patent right is usually entered as an asset at its cost; for if the sale has been a real purchase the success of the invention is reasonably assured. Until the success of the enterprise has been actually tested it would seem unreasonable to list patents as an asset at anything above cost.

Patents are often used as an asset at organization to validate large issues of securities. If the success of the patent is reasonably assured this practice can be justified. But hundreds of patents are taken out which never become the basis of profitable enterprises. The real value of a patent depends upon the earning power which it gives to an enterprise, and it is when this earning power is known or assured that it can properly be considered as an asset. In many cases it is an asset of great importance. A firm, for example, may own no other property than a patent, which it may lease to other parties, and gain a considerable income.

The amortization of a patent when carried as an asset, follows the general analysis given in the case of goodwill. A mechanical

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patent runs for seventeen years in the United States, and can be renewed under certain conditions. In the amortization of patents earning power should again be the decisive factor. If the rate of net income falls, due to other improvements, patents should be written down.

Trade marks, copyrights, etc., give use to assets similar to patents.

Leases

Assets based upon leases and other similar contracts are more definite in character than most intangibles. Usually the lessor is sufficiently confident of the value of the lease, that he is justified in entering the lease on the books as an asset at cost. If property is leased for an annual payment, the lease is not an asset (considering the year as the accounting period), and the payment in each case would be charged to expense, thus:

Lease Expense	$10,000	
Cash		$10,000

But if the lease is paid for in advance and covers several years, the payment is an asset. The situation in this case is analogous to the expenditure for stripping overburden explained in Chapter VI. A service is purchased and paid for, but the benefit from the expenditure will not be exhausted for several fiscal periods. Suppose, for example, a railroad company leases the road of a small line for ten years, paying for the lease a lump sum of $250,000. In this case the expenditure would be entered as an asset; thus:

Lease	$250,000	
Cash		$250,000

Each year a portion of the original payment would be considered as an expense. If the asset were amortized on the sinking fund plan at 6%, the entry for the first year would be:

Depreciation Expense	$18,967	
Lease		$18,967

or if a reserve account were used:

Depreciation Expense	$18,967	
Reserve for Depreciation		$18,967

In certain cases it might be urged that a lease contract constitutes an asset, even when the consideration is an annual payment. Thus the lessor in the first case above might consider the right to use

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the small line of considerable "strategic value," and hence, deem the contract an asset. If such a lease were entered as an asset when no expenditure takes place, the concurrent credit would necessarily be to Surplus or some proprietary account. Such a situation might occur even if there were competitive bidding for the use of the smaller road; for the service might be of little value to more than one line.

Franchises

Whenever a franchise granted by the state to a business enterprise gives to that firm monopolistic privileges, the franchise becomes an intangible asset. Its value depends upon the extent to which the firm's earning power is increased by such exclusive privileges; and, as in the case of any similar intangible, the ascertaining of that value is a difficult problem.

If a franchise is perpetual, it need not be amortized. In other cases it is amortized during its life. The treatment of franchises in the accounts is similar to that of goodwill.

Experimental Expense

As was pointed out in Chapter VI many cases of deferred expense, so-called, give rise to intangible assets. We shall consider another example, experimental expense, in this connection. Suppose a firm maintains a department for the purpose of making tests and experiments with a view to developing new processes and methods. Are such expenditures properly chargeable to an intangible asset account, or should they be considered an expense?

In so far as such a department is a permanent adjunct of the business, necessary to keep the firm abreast of competitors, such expenditures are clearly expense outlays. If experiments can reasonably be expected to result in profitable processes, the costs can be charged to capital outlay and the process itself or the patents representing it can be considered an intangible asset. Such a situation is unusual, however, and the proper analysis in such a case seems to be to charge these expenditures to expense; if the experiments result favorably it will be time enough then to revise the analysis.

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XI

THE ANALYSIS OF FINANCIAL STATEMENTS

The financial statistics of a business enterprise should furnish the data necessary to present: (1) An historical summary of the financial operations during an accounting period; and (2) the financial status of the enterprise at the end of each period. The statements which are prepared to furnish this information are the Income Statement and the Balance Sheet, respectively. These statements will be discussed in some detail in this chapter.

The Income Statement

Thus far the Expense and Revenue Statement has been considered only as a means of setting forth net income. It is true that the most important purpose of this statement and its underlying accounts is the determination of net income and the maintenance of the integriy of his figure; but other purposes may be served by arranging these accounts into the sections of a more detailed exhibit called an Income Statement. Such a statement contains all of the accounts showing the expenses and revenues for the period, together with the appropriations made from net income. The accounts are arranged in divisions for the purpose of presenting the historical data with regard to three distinct types of transactions which affect proprietorship during an accounting period: (1) the operating division (including the accounts representing the expenses incurred in producing the product or service, and the revenue accrued from the sale of the product or service); (2) the income division (including the accounts in which are recorded the transactions resulting from the contractual obligations incurred between the corporation—or other business unit—as an entity, and the various parties having equities in the business or against whom the business has equities); (3) the appropriation division (including the accounts in which are recorded the disposition of net income).

The Operating Division

The form of an income statement depends upon the nature of the particular enterprise. A manufacturing concern will require one form, a trading or mercantile business another, a public utility

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still another, etc. The ruling consideration with respect to the arrangement of the accounts appearing in the operating division should be the use to which they may be put by the operating official. The most convenient way to bring out the principles underlying the construction of this division will be by an illustration. Let us suppose that the Blair Manufacturing Co. is engaged in manufacturing traction engines, and in selling, as well as engines, farm implements and hardware, which are purchased from other parties. There are at least three distinct types of information of importance to the operating official: (1) the cost of manufacturing the engines; (2) the gross revenue from the sale of all the merchandise handled; (3) the selling costs. The first section of this division, therefore, should show the cost of manufacturing. We will suppose this statement to be in this case as follows:

INCOME STATEMENT.

MANUFACTURING SECTION.

Materials	$124,990	Cost of Engines Manufactured	$273,052
Labor (direct)	92,650		
Labor (indirect)	32,150	(Carried to Merchandise section.)	
Power and Heat	6,875		
Shop Supplies	2,500		
Miscellaneous Factory Expense	550		
Repairs to Machinery	1,537		
Depreciation of Factory Building	2,000		
Depreciation of Machinery	1,500		
Depreciation of Patents	2,500		
Administrative Expense chargeable to Manufacturing	5,800		
	$273,052		$273,052

The purpose of this section is to show the cost of the goods manufactured during the accounting period. The accounts appearing in the statement represent the ledger expense accounts of the same name.

The first item in this statement is materials. This represents the amount of materials consumed in manufacturing operations during the period covered by the statement. It represents the inventory at the beginning of the period plus the purchases during the period,

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minus the inventory at the end of the period. There are very few questions arising in connection with this item. The principle to be followed in the inventory of materials was discussed in Chapter VI. There it was shown that materials should usually be valued at cost price. The cost price includes all of the costs incident to delivering the materials to the store room, such as the amount paid for freight and cartage inward. The discounts obtained through the prompt payment of bills are generally considered as a credit to the materials account, although it is sometimes objected that these are financial transactions and that the amount of the discount in any case should be considered as an income. It seems illogical to treat such valuation items as income, but it might be claimed with reason that *failure* to take a discount is a cost of capital and not a manufacturing cost. On the basis of this reasoning the purchase price of the goods would be considered as the price allowed if payment is made within the discount period, while the difference between this amount and the invoice price, if payment is made after the discount date, is interest for the use of capital invested in the materials.

It is sometimes the practice to include a summary of the Materials account in the manufacturing section, as follows:

Materials

Inventory, Jan. 1	$ 25,280	
Purchases	142,960	
	168,240	
Inventory Dec. 31	43,250	
Net cost of Materials		$124,990

In case this method is not employed, the inventories for January 1st and December 31st may be obtained from the balance sheets of those dates.

Labor is usually divided into two classes; (1) that applied directly to the product (*direct labor*); and (2) that which is not directly applied to the product (*indirect labor*). The wages of the machine operator are an example of an expenditure for direct labor; the wages of the repair man are an expenditure for indirect labor. This classification is generally recognized in the accounts. In this case $92,650 of direct of direct labor was consumed, while $32,-150 of indirect labor was utilized.

Other special expense accounts record the costs of power and heat and of miscellaneous supplies and services. The cost of repairs

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and the formal depreciation charges are shown separately. These accounts should be taken together for determining the cost of maintaining the plant. The question is sometimes raised as to whether depreciation is a manufacturing expense or a deduction from income. The analysis of the function of the depreciation accounts already given is sufficient to show conclusively that the depreciation of the capital items used in the manufacturing process is a manufacturing expense.

The administrative expenses are incurred for the business as a whole, but a portion of them are chargeable to the manufacturing department. It is sometimes difficult to opportion these expenses between the departments; in which case it is the practice to include them in a separate section of the operating division.

In the illustration given interest was not included as a cost of manufacturing. Although it should be recognized that the product must sell for a price sufficient to yield a return equal to the market rate of interest, (if the enterprise is to be successful) no important purpose would be served by including a charge for interest in the manufacturing section. It is a simple matter to determine whether the rate of return is sufficient to yield the market rate of interest without maintaining an account for that purpose. If such an account were used, it would necessitate charging the amount of the interest to expense (a charge against proprietorship) and crediting the same amount to revenue (an increase in proprietorship). There is a better argument for including interest as a cost when an elaborate system of cost accounts is used for determining the relative costs of different processes of production; but even in such a case the practice is of doubtful expediency.

The total cost of the goods manufactured represents the costs for which the production manager is held responsible. The extent to which the subdivision of this figure shall be carried in the accounts depends upon the type of business and the needs of the operating official. In this case but ten accounts were used. The test as to whether a particular account should appear in the manufacturing section, or in some other portion of the income statement, should be whether or not the operating official in charge of manufacturing is responsible for the expenditure, or can make use of the information furnished.

The importance of the manufacturing section is its use for comparative purposes. The costs for one period may be compared with the costs of preceding periods, and a judgment formed as to the probable costs in the future. Such a judgment may be used for formulating plans of procedure or for budget making. If only

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one kind of product is being manufactured, the cost per unit may be obtained by dividing the total cost by the number of units produced. This figure may be compared with the price of similar articles on the market and a judgment made as to the desirability of continuing in this field of production. This information would not be obtainable, however, if more than one type of product were produced in the same factory[1].

The cost of manufacturing is carried from the manufacturing section to the merchandise section, which we will suppose would appear as follows:

MERCHANDISE SECTION.

Engines:		Engine Sales	$316,086
Cost to Manufacture (from Mfg. section).	$273,052	Hardware Sales	54,250
Less Inventory Dec. 31....	8,260	Farm Implement Sales.....	288,475
Cost of Engines sold.....	$264,792		
Hardware:			
Total Purchases	45,900		
Less Inventory Dec. 31....	2,650		
Cost of Hardware sold...	$ 43,250		
Implements:			
Total Purchases	191,825		
Less Inventory, Dec. 31...	21,300		
Cost of Farm Implements sold	$170,525		
Merchandise Revenue..... (to Trading section.)	120,244		
	$598,811		$598,811

The purpose of the merchandise section is to present a comparison between the cost of the goods handled and the revenue received from the sale of those goods. We have in this case the cost of goods manufactured brought down from the manufacturing section, from which is deducted the inventory of engines on hand leaving the cost of engines sold. The purchases of hardware minus the inventory on December 31st leaves the cost of hardware sold. The same is true for farm implements. On the credit side are entered the

[1] The problems of management will be discussed more fully in the next chapter.

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sales accounts for each class of product sold. It is the general practice to debit to the sales accounts the amount of the discounts allowed to customers for prompt payment of bills in the same manner as purchase discounts are credited to the purchase accounts.

A comparison between the cost of goods sold and the revenue accrued from sales may be used for finding the per cent of cost to selling price. This is of use in estimating the selling prices of new products when the cost has been determined. This percentage serves as an operating ratio which may be used for reflecting the operating efficiency of one period as compared with another. In the case of a purely mercantile business, the merchandise section is the first section of the Income Statement.

The amount of merchandise revenue, or gross merchandise profit, as it is sometimes called, is carried to the trading section of the income statement, which we will assume appears as follows:

TRADING SECTION.

Salesmen's Salaries	$ 22,485	Merchandise Revenue (from Mdse. Section.)	$120,244
Advertising	30,497		
Delivery Expense	3,240		
Miscellaneous Selling Expenses	1,780		
Depreciation of Selling Equipment	895		
Uncollectible Debts	1,500		
Administration Expense Chargeable to Trading Section	8,775		
Net Revenue (to income section)	51,072		
	$120,244		$120,244

The purpose of this section is to show the expense of the selling department of the business. The debit side shows the cost of the trading department for the year, and the credit side shows the amount of revenue obtained from that expenditure. The first two items, Salesmen's Salaries and Advertising, usually constitute the major portion of the expense for this department. Delivery Expense is sufficiently important in this case to be given a distinct account. The miscellaneous expenses incident to selling, are included in the next item. Depreciation of Selling Equipment is charged in this section in the same manner as the depreciation of factory equipment is charged to manufacturing.

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The amount of uncollectible accounts is charged in this section on the theory that the trading department is responsible for the mistakes made in extending credit. In some statements this item is included among the administrative expenses in a separate section. It is preferable, however, to charge this cost to the department responsible.

The administrative expenses in this case were apportioned between the manufacturing and trading sections. Where it is difficult or impractical to so apportion these expenses, it is customary to add another section to the operating division including only the administration expense on the one side and the trading revenue on the other. The balance is the net revenue from operation. In the illustration, however, the net revenue was obtained directly from the trading section.

The Income Division

Net revenue is the concluding figure of the operating division of the Income Statement. The second division begins with the items arising from the contractual relations of the corporation. This division is usually named the income section although other names are often used. We will suppose that the following represents the income section of the Income Statement of the Blair Manufacturing Co.:

Income Section

Taxes	$ 1,500	Net Revenue (from trading section.)	$ 50,072
Interest	2,250		
Net Income (to appropriation section.)	48,112	Interest Received	790
	$ 51,862		$ 51,862

The net income figure represents the amount of income left for the proprietor to appropriate for whatever purposes desired. All charges up to the figure of net revenue are made regardless of the type of organization. The amount of net revenue would be the same regardless of the sources from which the capital was obtained. Thus if a concern were capitalized exclusively through the issue of stock, it would have the same net revenue figure as it would if the capital were obtained through issues of both stocks and bonds. But the figure of net income would vary according to which method of financiering were employed. Thus it is seen that from the standpoint of the operating management interest payments represent part of the earnings.

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One of the deductions shown in the illustration above is for taxes. It is sometimes argued that taxes should be included in the operation division of the Income Statement in the manufacturing or trading sections. It is urged that taxes are an expense. It is true that taxes are a cost of production in the sense that the revenue must be sufficient to cover their payment; but this expenditure does not in any way reflect the efficiency of the operating management. The tax rate is determined by the state, and taxes are assessed against property regardless of the efficiency of the management. Including the tax deduction in the income section, however, cannot be regarded as the most approved procedure. In railroad accounting the tax deduction is made in a section intermediate between the operating and income divisions. This is highly commendable practice.

In case a company rents a part of its property, it is customary to enter the rental payments in the operating division as a cost of production. In as much as a part of the rental payment is a payment of interest for the use of capital, this procedure is open to criticism. The scientifically accurate procedure would be to apportion the rental payment between two divisions of the income statement; the part of the payment which covers depreciation is properly chargeable to the operating division, and the part which represents interest is chargeable to the income section.

Interest received on capital loaned is credited to the income section. Interest earnings of a manufacuring concern, for example, are incidental to the main operation of the business. Therefore, such earnings may not be credited to the operating division.

The Appropriation Division

The net income is at the disposal of the proprietor, and in the case of a corporation, it is from this figure that the board of directors makes appropriations. The appropriations which are made from net income are recorded in the third division of the Income Statement. We will suppose that the board of directors of the Blair Manufacturing Co. has made the appropriations from net income which are shown in the appropriation section, as follows:

APPROPRIATIONS OF NET INCOME.

Sinking Fund Installment	$ 4,500	Net Income (from income section.)	$48,112
Reserve for Contingencies	5,000		
Dividends Declared	25,000		
Balance Carried to Surplus	13,612		
	$48,112		$48,112

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The Sinking Fund installment is an appropriation of net income, which is usually made in connection with a bond contract as was explained in Chapter V. The reserve for contingencies represents an amount which the directors vote to set aside as a "safety" reserve to be used in case of exceptional losses or other unforseen contingencies. It is a part of the proprietorship that will appear on the balance sheet labeled for a particular purpose. The dividends are then declared leaving a balance to be carried to the accumulated surplus. This amount will be added to the amount already appearing in Surplus.

In case there are any further adjustments to be made in the proprietary accounts these will be made in the Surplus statement, which, we will suppose, appears as follows:

SURPLUS STATEMENT.

Damage from flood	$10,000	Balance at beginning of period	$35,261
Stock dividend	25,000	Unappropriated Net Income (carried from the Income Statement)	13,612
Balance (as carried on Balance Sheet)	10,828		
	$45,828		$45,828

This statement is the connecting link between the Income Statement and the Balance Sheet. It represents the Surplus account in the ledger. Although we are discussing this statement in connection with the Income Statement it constitutes a distinct exhibit of facts.

In this case it was assumed that the plant had been damaged by a flood to such an extent that it would have distorted the statement of operations for comparative purposes, if charged as an expense in the annual Income Statement. Therefore, the amount of the loss was charged to the accumulated surplus. The need for similar adjustments frequently arises.

A stock dividend is declared out of the accumulated surplus. This is usually done for the purpose of reducing the amount of surplus shown on the balance sheet to allow a payment of the same amount of cash dividends at a lower rate per share.

The Income Statement covers one fiscal period, and is independent of all other periods, while the Surplus statement covers the whole life of an enterprise and is carried on the balance sheet as a proprietary account.

As was stated in the earlier part of this chapter, the form of the income statement as well as the number and kinds of ac-

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counts that are included in it is dependent upon the type of business involved and the needs of the management. The income statement given in the illustration above is in the account form. Frequently the information is listed in one or more columns so that it may be read more easily by those who have little knowledge of accounting technique. The guiding considerations in the construction of the statement are much the same in all cases. The uniform accounting statements required by the Interstate Commerce Commission have been used as a model from which income statements for other utilities have ben developed. The following is the Income Statement for the Pennsylvania Railroad Company for the year 1914:

INCOME STATEMENT.[2]

OF THE PENNSYLVANIA RAILROAD COMPANY

FOR THE YEAR ENDING DECEMBER 31, 1914.

Operating Income:	1914.	
Railway Operating Revenues	$181,184,822.32	
Railway Operating Expenses	138,616,672.07	
Net Revenue from Railway Operations		$42,568,150.25
Railway Tax Accruals	7,461,892.52	
Uncollectible Railway Revenues	11,313.24	
		7,473,205.76
Railway Operating Income		$35,094,944.49
Non-Operating Income:		
Income from lease of road	$ 7,530.22	
Joint facility rent income	1,439,634.07	
Miscellaneous rent income	748,062.51	
Miscellaneous non-operating physical property	72,503.24	
Dividend income	11,438,483.83	
Income from funded securities	918,886.21	
Income from unfunded securities and accts.	893,077.19	
Income from sinking and other reserve funds	1,091,353.42	
Miscellaneous income	87,748.24	
Total non-operating income		16,697,278.93
Gross Income		$51,792,223.42

[2] From the sixty-eight annual report of the Pennsylvania Railroad Company, page 2.

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Deductions from Gross Income:		
Hire of equipment—Debit balance	$ 629,607.09	
Rent for leased roads	5,566,867.52	
Joint facility rents	1,057,635.00	
Miscellaneous rents	375,289.48	
Interest on funded debt	9,569,414..50	
Miscellaneous Tax accruals	46,628.31	
Interest on unfunded debt	163,802.18	
Loss from operation of leased roads	58,355.67	
Miscellaneous deductions	233,858.85	
Total deductions from gross income		17,701,458.60
Net Income		$34,090,764.82
Disposition of Net Income:		
Income applied to sinking and other reserve funds	$ 1,785,242.65	
Dividend appropriations of income (6%)	29,952,186.00	
Income appropriated for investment in physical property:		
Expended for account of revision of grades and alignment and for additional tracks, elimination of grade-crossings, improvement of equipment, etc.	2,230,335.64	
		33,967,764.29
Balance transferred to credit of Profit and Loss		$ 123,000.53

PROFIT AND LOSS STATEMENT.

Amount to credit of Profit and Loss, December 31, 1913	$29,027,180.66
Balance of net income for the year	123,000.53
Sundry net credits during the year	2,727,174.28
Amount to credit of Profit and Loss, December 31, 1914	$31,877,355.47

The first section of this statement constitutes the operating division in the classification given above; the second and third sections represent the income division; while the appropriation division is shown under the heading, "Disposition of Net Income." The Profit and Loss Statement is another name for the Surplus statement mentioned above. This is an illustration of the fact that the variations in income statements are largely matters of terminology.

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The importance of properly subdividing the income statement is becoming more urgent with the extension of the corporate practice of raising capital through issues of various classes of securities. The bondholders are interested in the income statement as well as the stockholders. The interest on bonds is paid out of income, and the information furnished by the income statement shows the bondholders the probability of continued interest payments. The analysis of income presented by the income statement is of particular importance to the income bondholder. Interest is paid on such bonds provided a sufficient amount is earned over and above the amount necessary to pay interest to the prior lien securities. The placing of an account in the wrong section through an error in principle might cause the income bondholder to lose the interest for a year. For example, if the sinking fund installment be considered an expense instead of an appropriation of net income, the equity of the income bondholder would be jeopardized.

Thus it is seen that the Income Statement furnishes the information necessary for other interests than those of the proprietor. Even the interest of the public is reflected in the income statement. In the case of corporations, the government tax on incomes is a deduction from the net revenue figure.

The Balance Sheet

The Balance Sheet is the statement which shows the financial condition of an enterprise at a stated date. Many of the questions which arise in connection with the items which appear in the Balance Sheet have already been discussed in the preceding chapters. It remains to analyze the statement with a view to determining the form of presentation and the uses to which the classification of facts may be put.

As usually constructed the balance sheet is the same in form as a ledger account. On the left side are listed the assets, debit valuation items, and deficit if one exists. On the right side are listed proprietorship accounts, liabilities, and credit valuation accounts. The left side is usually designated as the asset side, and the right-hand column is headed, liabilities. It is unfortunate that this nomenclature has been universally adopted, as the headings of the two sides often mislead the person unfamiliar with accounting technique as to the nature of some of the items. Thus, Discount on Stock appears on the asset side and Reserve for Depreciation on the liability side. But if it is remembered that the terms *asset* and *liability* are used in a conventional manner in this connection, no harm will result:

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The Form of the Balance Sheet

It is customary to list the items on both sides in groups. The accounts on the asset side are grouped into: (1) fixed assets; (2) current assets; (3) valuation accounts and deferred debit items; Those on the liability side are classified as :(1) capital liabilities; (2) current liabilities; (3) valuation accounts and deferred credit items; and (4) surplus and proprietary reserves.

Let us assume that the balance sheet of the Blair Manufacturing Co., whose Income Statement was given above, shows the following facts December 31st:

Assets.

Fixed Assets:		
Land	$ 20,000	
Buildings	95,000	
Patents	100,000	
Machinery	25,250	
Office Equipment	10,800	
Sinking Fund Assets	9,225	
		$260,275
Current Assets:		
Merchandise Inventory	$ 32,210	
Raw Materials	43,250	
Notes Receivable	5,300	
Accounts Receivable	10,200	
Cash	14,863	
		105,823
Deferred Debit Items:		
Unexpired Insurance	$ 1,580	
Prepaid Advertising	5,250	
		6,830
		$372,928

Liabilities.

Capital:		
Capital Stock	$225,00	
Mortgage Bonds	75,000	
		$300,000
Current Liabilities:		
Notes Payable	$ 15,000	
Accounts Payable	10,890	
Wages Accrued	2,850	
Interest Accrued	560	
		29,300

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Deferred Credit Items:		
Reserve for Depreciation of buildings	$ 5,800	
Reserve for Depreciation of Patents.	5,000	
Reserve for Depreciation of Machinery	2,000	
Reserve for Bad Debts	1,875	
		14,675
Surplus and Proprietary Reserves:		
Reserve for Sinking Fund	$ 9,225	
Reserve for Contingencies	8,900	
Surplus	10,828	
		28,953
		$372,928

This represents the general form of the balance sheet. Some accountants prefer to place the current assets and current liabilities above the fixed assets and capital, but the location of these groups is a matter of minor importance.

The fixed assets total $260,275 and the capital liabilities total $300,000. This means that the major portion of the capital raised through the sale of stock and bonds was invested in permanent property. The relation between fixed assets and capital liabilities varies between industries. In some lines practically all of the capital is invested in fixed assets while in others a large proportion is in the current assets. Conclusions as to the financial condition of an enterprise can be drawn from this and similar comparisons.

The first account on the assets side is Land. This item is valued at $20,000. As was shown in Chapter VI, land is often maintained on the books at the cost price regardless of market fluctuations; but in case an increment in land value is taken into account the concurrent credit should be to a surplus account and not to income. No such credit having been made to either income or surplus in this illustration, it may be assumed that the Land account is stated at the same figure as on the balance sheet for the preceding period.

The Building account appears on the asset side at $95,000, and there is a Reserve for Depreciation of Buildings of $5,800. These two accounts taken together show that the estimated present value of buildings is $89,200. It is important that these accounts be read as one in determining the value of buildings. In order to prevent

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a misunderstanding as to the Reserve for Depreciation account, it is often listed on the asset side as a deduction; thus:

Buildings	$95,000
Less Reserve for Depreciation	5,800
	$89,200

The Patents stand at $100,000 and a Reserve for Depreciation of Patents of $5,000, appears on the liability side showing that the estimated present value of the patents is $95,000. The patents in this case constitute a large proportion of the original investment. This condition is often the case in manufacturing establishments where the product is a patented article. The valuations of machinery and office equipment may be obtained from the balance sheet in the same manner as for buildings and patents.

The Sinking Fund Assets account represents the amount of assets which have been placed in a special fund for the purpose of paying off the bonds at maturity. The Reserve for Sinking Fund on the liability side shows that this fund is being accumulated out of profits. If it were not being accumulated from profits but were simply set up out of the original capital, there would be no account for Reserve for Sinking Fund on the liability side.

The first item under capital liabilities is Capital Stock $225,000. This represents the amount of stock outstanding after the stock dividend of $25,000 has been issued. Mortgage Bonds, $75,000 represents the amount of bonds outstanding. An intimation of the past financial policy of the enterprise may be obtained from a comparison of these accounts. The fact that the major portion of the investment is in stock, shows that it has been the policy of this firm to do most of its financiering through stock issues and to resort to bond issues for comparatively small amounts of capital. Such, for example, has been the policy of the Pennsylvania Railroad. If the bonds were equal to or greater than the stock, it would show that the business was being operated largely on borrowed capital. This in itself would not be a criticism of the financial policy but would be an indication of a type of financial management that would bear further scrutiny.

The current assets total $105,823, and the current liabilities $29,300. This indicates a favorable operating condition. Often a firm whose total assets greatly exceed the total outside liabilities will become financially embarrassed because of the fact that there were not sufficient assets which could be readily converted into cash with which to meet current obligations. Cases are known where com-

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panies have been declared insolvent because of such a situation. The cash alone in this case ($14,863) is sufficient to meet the accounts which are likely to be presented for immediate payment; the accounts payable being but $10,890, the wages accrued but $2,850, and the Interest accrued $560. It is improbable that all of these claims will be presented for payment at once, but it is safe to keep a working fund of cash to meet such a contingency. The notes payable usually extend over a longer period of time than the accounts, but are considered as current liabilities because few of them cover a period of more than a year. All liabilities incurred for periods of less than one year are considered as current.

The assets other than cash which are listed as current are those which are readily convertible into cash. The first item in the current assets of the above balance sheet is Merchandise Inventory ($32,210). This represents the value placed on the goods on hand ready for sale at the time the balance sheet was prepared. The Raw Materials inventory ($43,250) represents the value of raw materials on hand at the date of the balance sheet. This statement shows a large amount of raw materials in proportion to the annual sales. That is, a rather large amount of capital is at present tied up in materials. This throws some light upon the general success of the business for the period. The Notes Receivable account ($5,300) represents the short term claims against outside parties for which the firm holds promissory notes. The amount of these notes on hand as represented in the account indicates that the management has been careful in extending credit on this basis.

Accounts receivable ($10,200) represents the open book accounts of customers. There is always some loss incurred through the failure of some customers to meet their bills, and it is to cover such losses that the Reserve for Bad Debts ($1,875) appears on the liability side. The net estimated value of the accounts receivable is, therefore, $8,325. At the time that an account has proven to be worthless, it is charged against the Reserve for Bad Debts and credited to Accounts Receivable.

The accounts appearing under deferred debits, Unexpired Insurance and Prepaid Advertising, are assets of a different type from the current assets. These items are sometimes called expenses paid in advance because they represent expenditures for services not yet received. Another type of deferred debit item which is not shown in the illustration is Discount on Stock. An example of still another debit valuation account is an exceptional loss which is being amortized during a series of years. Thus if a large amount of property is destroyed in one year it is sometimes the practice to carry the

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loss as a deferred debit item, charging a portion to expense or surplus each year.

The deferred credit items in this case are all valuation accounts and have been discussed in connection with the asset items. Another type of deferred credit item is Premium on Bonds which is amortized in the annual interest payments. The nature of this account has been discussed in the preceding chapters.

A question arises as to the treatment on the balance sheet of so-called *contingent* liabilities. These are not liabilities at the time a balance sheet is taken, but may become real liabilities under certain conditions. Thus a firm may endorse the note of another party, guaranteeing to pay the note in case the other party fails to do so. Should such a contingency be shown on the balance sheet, and is so, how? Some accountants favor the carrying of the item on the balance sheet as a liability labeled as contingent. Such a procedure necessitates the carrying of a like amount on the asset side in a contingent asset or valuation account. That is if a note has been endorsed, it would be carried as a liability called Notes Receivable Discounted, and it would also be carried on the asset side, under the same name. Nothing is gained from carrying such items in this manner and therefore they are often omitted from the statement proper; but a note should be appended stating that the company is contingently liable for the amount stated. A person reading the balance sheet may then judge for himself as to the probability of the item becoming a real liability. If it should become a real liability, the proprietorship would be reduced by a like amount.

The last section on the credit side of the balance sheet is made up of the various proprietorship items exclusive of capital stock. These items usually consist in specifically labeled proprietorship accounts. Thus, Reserve for Sinking Fund represents the amount which the stockholders are withholding from profits for the purpose of retiring bonds and obtaining the bondholder's equity in the enterprise. The Reserve for Contingencies represents the amount which the directors estimate should be maintained for meeting exceptional losses in order that dividends may be paid regularly. Surplus is the amount of proprietorship which has not been specifically appropriated for any purpose, but which still remains in the business.

Consolidated Balance Sheet

Under the corporate form of organization one of the methods employed in consolidating various business enterprises into one operating unit is the holding company. Under this method one company will purchase the stock, either in whole or in part, of the companies to be consolidated. Having a majority of the stock of each company in its possession, the holding company has complete

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control over the management. Each of the companies will then retain its corporate organization and maintain a system of accounts. The title of the property remains in the name of the separate corporations, but the control of the property is in the holding company through stock ownership. The question as to how the balance sheet of the holding company with respect to the companies under its control should be prepared is of considerable interest.

The simplest way to present the facts is to carry the stock, which is held in the treasury, on the balance sheet as an asset, and to present separate balance sheets for each of the subsidiary companies. This practice, however, obscures the facts which the party interested in the holding company desires to have presented. What is the condition of the property as a whole which is under the control of the holding company? This can only be obtained through what is called a *consolidated* balance sheet. This consists in a combination of all of the balance sheets of the subsidiary companies into one balance sheet. The stock of the subsidiary companies is not carried as an asset under this plan but all of the assets and all of the liabilities are combined in arriving at a consolidated balance sheet.

There are several points which require consideration in preparing such a statement. The advances made by the holding company to the subsidiaries cannot be considered as assets; as the same items would be liabilities of the subsidiary company. Further, the accounts which represent relations between the various subsidiary companies should be omitted from the consolidated statement. Finally, in case the holding company has issued bonds and has utilized the securities of the subsidiary company as collateral for the loan, the bonds of the holding company should appear as liabilities, but the securities held should not be treated as assets.

As an illustration of the consolidated balance sheet let us suppose that the A, B, and C companies are to be consolidated. The A company has purchased a controlling interest in the other two companies. The separate balance sheets at the time of consolidation are as follows:

A COMPANY.

Assets

Fixed Assets:		
Real Estate	$ 50,000	
Building	30,000	
Patents	25,000	
Machinery	15,000	
Stock of B. Co.	55,000	
Stock of C. Co.	85,000	
		$260,000

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Current Assets:		
Merchandise	$ 25,000	
Advances to B and C	15,000	
Accounts Receivable	20,000	
Cash	5,000	
		65,000
		$325,000

Liabilities

Capital:		
Capital Stock	$200,000	
Bonds (secured by stock of B and C)	50,000	
		$250,000
Current:		
Notes Payable	$ 25,000	
Accounts Payable	10,000	
		35,000
Deferred Credits:		
Reserve for Depreciation	$ 10,000	
Surplus	30,000	
		$325,000

B. COMPANY.

Assets

Fixed:		
Real Estate	$ 25,000	
Buildings	20,000	
Patents	10,000	
Machinery	25,000	
Stock of C. Co.	5,000	
		$ 85,000
Current:		
Merchandise	$ 25,000	
Notes Receivable	10,000	
Accounts Receivable	8,000	
Cash	13,000	
		56,000
		$141,000

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Liabilities

Capital:		
Capital Stock	$ 75,000	
Bonds	50,000	
		$125,000
Current:		
Accounts Payable	$ 3,000	
Due to A. Co.	5,000	
		8,000
Deferred Credits:		
Reserve for Depreciation	5,000	
Surplus	3,000	
		$141,000

C. COMPANY.

Assets

Fixed:		
Real Estate	$ 15,000	
Buildings	25,000	
Patents	35,000	
Machinery	30,000	
		$105,000
Current:		
Merchandise	$ 20,000	
Notes Receivable	8,000	
Accounts Receivable	10,000	
Cash	15,000	
		53,000
		$158,000

Liabilities

Capital:		
Capital Stock	$100,000	
Bonds	20,000	
		$ 20,000
Current:		
Accounts Payable	3,000	
Due to A. Co.	10,000	
		13,000
Deferred Credits:		
Reserve for Depreciation		12,000
Surplus		13,000
		$158,000

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The A Company is the holding company in this case; therefore, the consolidated balance sheet will be under the name of the A Company. It will appear as follows:

CONSOLIDATED BALANCE SHEET OF THE A. COMPANY AND ITS SUBSIDIARIES.

Assets

Fixed:		
Real Estate	$ 90,000	
Buildings	75,000	
Patents	70,000	
Machinery	70,000	
		$305,000
Current:		
Merchandise	$ 70,000	
Notes Receivable	18,000	
Accounts Receivable	38,000	
Cash	33,000	
		159,000
		$464,000

Liabilities

Capital:		
Capital Stock (outstanding)	$230,000	
Bonds	120,000	
		$350,000
Current:		
Notes Payable	25,000	
Accounts Payable	16,000	
		41,000
Deferred Credits:		
Reserve for Depreciation		27,000
Surplus		46,000
		$464,000

The consolidated balance sheet shows more clearly the condition of the business as a whole. Its chief advantage lies in the fact that all accounts representing the intercorporate relations of the several companies have been eliminated. Consolidated balance sheets for many of the large corporations are published in the various corporation manuals. The following are the balance sheets of the American

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Telephone and Telegraph Company; the first being the general balance sheet of the company, the second being the consolidated balance sheet of the entire system for 1913:

GENERAL BALANCE SHEET[a]

AMERICAN TELEPHONE AND TELEGRAPH COMPANY

DECEMBER 31.

Assets 1913	
Stocks of assoc. cos.	$454,307,264
Advance to assoc. cos.	76,677,615
Telephones	14,279,678
Real Estate	507,431
Long distance telephone plant	49,269,173
Cash and deposits	22,199,228
Spec. demand notes	34,311,230
Accounts receivable	4,404,689
Total	$655,956,308

Liabilities 1913	
Capital stock	$344,616,300
Bonded debt	159,591,000
Coupon notes	5,000
Other notes payable	34,300,000
Indebt'ness to West Un. Tel. Co.	4,000,000
Div. payable January 15	6,892,326
Interest and taxes accrued	3,091,571
Accounts payable	932,298
Depreciation reserve	36,836,187
Employees Benefit Fund	2,035,653
Surplus	63,655,973
Total	$655,956,308

COMBINED BALANCE SHEET

(ENTIRE SYSTEM IN UNITED STATES)

DECEMBER 31.

Assets 1913	
Telephone plant	$797,159,487
Supplies, tools, etc.	20,083,113
Receivables	40,349,027
Cash	31,888,858
Stocks and bonds	90,523,610
Total	$980,004,095

[a] From Moody's Manual of Corporation Securities for 1914, p. 2927.

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Liabilities 1913	
Capital stock	$395,224,531
Bonded debts	341,147,485
Bills payable	33,743,368
Accounts payable	26,471,681
Employees Benefit Fund	8,919,335
Surplus and reserves	174,497,695
Total	$980,004,095

The Comparative Balance Sheet

It has been stated that the Income Statement furnishes an historical exhibit of the operation of the business for a period of time; while the Balance Sheet furnishes a statement of the momentary financial condition. A comparison of two balance sheets, one taken at the beginning of a period, and one at the end, may be used to throw considerable light on the intervening period without the aid of the income statement. This fact is of considerable importance especially where published statements furnish a series of balance sheets without the accompanying income statements. If the amount of profits distributed in dividends is known as well as the facts concerning new investment, the total profits for a period may be ascertained from a comparison of two succeeding balance sheets. All of the profits which have not been distributed will appear in the proprietary accounts. The increase in proprietary accounts plus the amount paid in dividends less the new investment (if any such exists) will be the total profits for the period. Still further information may be obtained by comparing the items on the succeeding balance sheets.

As an illustration of the comparative balance sheet, let us take the following simple statement of the Nesbit Company and analyze the items appearing therein.

COMPARATIVE BALANCE SHEET, THE NESBIT CO., DEC. 31.

Assets	1911	1910
Real Estate	$ 3,850,000	$ 3,850,000
Goodwill	2,000,000	2,000,000
Machinery	1,128,288	1,072,185
Securities Owned	1,121,670	1,121,670
Treasury Securities	237,000	237,000
Cash	92,385	241,966
Accounts and Bills Receivable	1,143,211	1,116,893
Sinking Fund Assets	182,906	200,787
Inventories	1,405,138	1,109,835
	$11,160,598	$10,950,336

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Liabilities		
Capital Stock	$ 6,485,800	$ 6,485,800
Bonded Debt	2,000,000	2,100,000
Interest on Bonds	122,213	122,388
Accounts and Bills Payable	196,740	119,717
Reserve for Taxes, etc.	9,002	12,495
Sinking Fund Reserve	682,906	600,787
Surplus	1,663,937	1,509,149
	$11,160,598	$10,950,336

First what were the profits for the year? Assuming that a 5% dividend has been paid, the profits were $561,197. This figure is found by adding the increases in the proprietary accounts to the amount of the dividend paid ($324,290) which does not appear on the statement. The increase in the Sinking Fund Reserve was $82,119, and in the Surplus $154,788. The sum of the three amounts gives the profit, $561,197. If the Capital Stock account had shown an increase the question would arise as to whether this increase represented a stock dividend or new investment. If the increase were a stock dividend this fact could be determined with reasonable certainty by scrutinizing the Surplus account.

A further analysis discloses the fact that the Sinking Fund Assets decreased as did also the Bonded Debt. The fact that Sinking Fund Assets appears on the balance sheet shows that specific assets are being set aside for the purpose of retiring the bonds. Furthermore, the fact that the bonded debt decreased seems to indicate that these assets are being used to retire the original bonds. This may be verified by showing that the increase in the Sinking Fund Reserve, if added to the Sinking Fund Assets of the previous year, would give $282,906. This is just $100,000 greater than the amount appearing in the latter account and is the same amount by which the bonds decreased.

The surplus increased by $154,788, but the cash decreased by $149,581, showing that the profits were not realized in cash, but must be in the form of other assets. Inventories have increased by $295,303 and this shows that most of the profits retained in the business have been invested in this form of assets. Machinery has increased by $56,103, which shows that an added investment has been made in this form of capital. This in part at least explains the increase in Accounts and Bills Payable of $77,023.

Comparisons of this sort will shed considerable light on business operations. Of course, it is impossible to state that a specific asset was used for a particular purpose, but reasonably certain conclusions

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may be drawn as to actual transactions. It is convenient in making such comparisons to list the changes in parallel columns as follows:

Sources from which Assets were obtained		*Utilization of the Assets*	
Cash	$149,581	Machinery	$ 56,103
Sinking Fund Assets	17,881	Accts. and Bills Rec.	25,318
Accounts and Bills Payable	77,023	Inventories	295,303
Sinking Fund Reserve	82,119	Bonded Debt	100,000
Surplus	154,788	Interest on Bonds	175
		Reserve for taxes	3,493
	$481,392		$481,392

In the first column are listed all of the accounts which represent sources from which assets were obtained. The assets which decreased during the period explain where some funds were obtained for other purposes. So also the increases in liabilities and in proprietorship accounts show where funds were obtained; for the incurring of a liability must be accompanied by the receipt of an asset or the decrease of another liability, and the increases in proprietorship must explain the receipt of some asset or a decrease in a liability. Therefore, all decreases in asset accounts and increases in liability and proprietorship accounts are placed in the first column. The items in the second column represent the manner in which the assets were utilized. There are three ways in which the assets could be expended: (1) in the acquisition of new assets; (2) in the payment of liabilities; and (3) in the distribution of assets to the proprietors, or actual loss of assets. Therefore the second column contains increases in assets, decreases in liabilities, and decreases in proprietorship.

Such a statement as presented has no value in itself, but may be used as a tool in analyzing the balance sheet items. This method of analyzing balance sheets is an aid in reading the published reports of corporations.

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XII

SPECIAL FIELDS OF ACCOUNTING

Thus far we have been concerned with the general principles of financial accounting, for the most part from the standpoint of the problems of proprietorship. In the present chapter the more important of the special phases of accounting will be given cursory consideration.

Auditing

In a broad sense any examination of the financial records of a business enterprise constitutes an *audit*. Originally the chief work of the accountant consisted in making examinations, and auditing is still a very important branch of general accounting practice.

An audit may be conducted for the general purpose of testing the clerical accuracy of the bookkeeper's work and the accounting analysis upon which it is based; or it may be undertaken for some more specific end, such as determination of solvency, the detection of fraud, etc.

A large number of enterprises feel obliged to have their records audited regularly to give authenticity to the statements issued to the stockholders. The annual report in such a case has a statement from the auditing accountants appended, declaring the condition of the company to be as represented. Too often such audits are only perfunctory and hence of no value. A company may have its books audited in order to present a verified statement to actual or prospective creditors as to solvency conditions. Frequently an audit will be undertaken by a group of stockholders or other interested parties, if for any reason it is suspected that the books are improperly kept, or if the company is not presenting satisfactory statements in its reports.

A dispute between the minority and majority stockholders of a railroad company furnishes an illustration of an audit conducted in the interests of one of the equities involved. In this case the majority stockholders are represented by a holding company. The company wishes to purchase the equity of the minority stockholders in the subsidiary line. The question arises: what should be the purchase price of the stock? An extensive examination reveals the fact that the value of the stock is considerably above the market price per

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share. The important facts disclosed by the auditors on which this conclusion is based, are as follows.

The holding company, owning a majority interest in the stock, has had active financial control of the enterprise. It has been the policy of the parent company to use the subsidiary line as a feeder to its main properties. The income on the investment in the smaller road is obtained primarily from the added traffic derived from the control of this road, rather than from dividends on the stock held. Consequently the controlling interest has had little object in declaring large dividends. It is shown further that it has been the policy of the management to understate net income by charging improvements to expense, and thereby creating secret reserves. These facts have resulted in building up the proprietary equity in the business to an extent not reflected on the stock market.

The following case presents a somewhat similar situation. An agreement is entered into between the preferred and common stock holders of a corporation at the time of organization, which provides that the preferred stock shall have exclusive voting privileges until five consecutive annual 7% dividends have been paid on the stock. After the payment of these dividends the common stock is to acquire pro rata representation with the preferred. At the end of ten years, although there has been a favorable showing of gross revenue throughout this period, net income has not been sufficient to pay the dividends required for the consummation of the above agreement. The common stockholders institute an investigation of the accounting methods to determine whether or not net income has been correctly stated.

In this case also it was found that net income had been understated through errors in accounting analysis. Sinking fund installments, and some items of new construction in addition to actual depreciation, had been charged to the expense accounts. Had these amounts been properly charged, net income would have been sufficient to allow the payment of 7% on the preferred stock each year. Thus the common stockholders have been prevented, through errors in accounting judgment, from exercising their rightful control of the business for a period of five years.

Frequently outside interests desire to have the financial records of a business examined. The purposes of such examinations are varied, and many peculiar problems present themselves in specific cases. The following case furnishes an illustration. In a certain town both a municipal enterprise and a private concern are furnishing electric light and power. The municipal company (which is also the city water company) is cutting prices far below cost to

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the private concern. The latter company has reason to believe that the municipal enterprise is not allocating costs properly between the water and light departments and desires an audit of the municipal company's books to determine whether or not the water rates are covering expense properly incident to the production of light.

The state and federal governments are responsible for a large number of examinations. The books of banking institutions are regularly examined by government auditors. In the case of public utilities the Interstate Commerce Commission has the power to examine the books of an enterprise under its jurisdiction at any time. In many states the public utilities commission has similar powers.

The following case illustrates a type of accounting problem which frequently presents itself to the state commissions. A power company petitions the public utilities commission for permission to issue $10,000,000 in capital stock. An appraisal shows the value of the physical property to be $7,000,000. The company argues that an intangible asset of $3,000,000 exists because of early losses. Assuming the legitimacy of such an intangible, the task for the auditor in this case is the examination of the financial records covering the period in question in order to determine the amount of net income or loss for each year.

The above cases emphasize the fact that although one of the purposes of the general audit is the verification of the clerical work, it is a much more important function of the auditor to discover whether or not sound accounting principles have been observed. The checking of column totals is not a particularly illuminating process. In fact, column totals may check, debits may equal credits, and still flagrant abuses of accounting principles may exist. An intelligent examination of the year's financial statements, or a series of such statements covering several fiscal periods, may furnish as much or more information concerning the history of the business and its present financial status as will a detailed audit of all the books and underlying papers. If depreciation charges, for example, be considered a distribution of net income, instead of a charge to expense, the accuracy of the clerical work may be unquestioned, but nevertheless a serious accounting error has occurred which affects one of the most important figures shown by the records, viz.: *net income.*

Often the auditor has to deal not only withm clerical inaccuracies and errors in accounting analysis, but also with fraud. The most common fraud is the misappropriation of cash or similar assets. It is especially because of this fact that an auditor should exercise

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discretion in his relations with the officials and employes of the enterprise whose books are being examined. It is his duty to obtain the facts even if these facts are not to the advantage of his client. The various methods of detecting errors and fraud are a part of the technique of auditing and are outside the scope of this discussion.

It is evident from this brief discussion of the nature and purposes of auditing that the successful auditor needs a thorough training in theory and an extensive practical experience. In the first place he needs an exhaustive knowledge of accounting principles; the examination of the financial statistics of modern business enterprises involves the knowledge of all the accounting principles upon which such records are based and to which they should conform. Further, the auditor needs a concrete knowledge of the particular types of records used in various kinds of industry, such as banking, manufacturing, retailing, etc. Such a knowledge can only be secured through actual experience. Again, the work an auditor is called upon to do involves many questions of business law and finance; hence a general knowledge of these subjects is invaluable. Finally, the auditor should be able to express his findings with sufficient clearness and simplicity that they may be readily appreciated by any interested parties.

Cost Accounting

A General Statement of the Problem

As was suggested in Chapter I, the problems of management give rise to a distinct and important branch of accounting; viz.; *cost accounting.* Our study of accounting principles in the preceding chapters has been almost entirely outside of the questions of management, and has had to do with the construction and analysis of accounts from the standpoint of the equities involved—especially the proprietary equity. However, the manager should have at his disposal more extensive statistical information than that furnished by the ordinary double entry system of accounts. It is true that the ledger accounts and the financial statements (especially the Income Statement) furnish much data of value to the management. If the information presented by the Income Statement is well classified considerable light is thrown upon the process by which the resulting net income or loss is attained. Even the amount of net income provides a crude test of efficiency through comparison with other establishments in the same field of industry. But such information is inadequate in view of the present emphasis upon efficiency in

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production. For how can the manager know that a creditable showing will be maintained unless there is much further information available as to the business process? Or, if the net result of operation is unfavorable, how can the situation be remedied without such information? Let us examine some of the more important problems which present themselves to the manager and which can be solved, if at all, only with the aid of cost statistics.

Many business firms produce more than one product. In such cases it is not sufficient that total revenue and total expense be ascertained and compared; the expense of producing each distinct commodity or service and the revenue accruing from the sale of the same must be determined. This is a relatively simple matter as far as revenues are concerned, but usually the allocation of expense to a particlar line of product is, as we shall see, a difficult problem. Many firms have discovered, after introducing a cost system, that one or more products was being produced at a loss; this fact had not been previously recognized because the loss thus suffered had been covered by profits on other lines. Similarly other firms which have been losing money have discovered that by specializing in a particular direction, losses could be turned into profits.

While this is the day of specialization, very few enterprises are producing a single commodity or service; hence the problem of allocating expenses to a particular line of product is an almost universal problem of management. In many cases circumstances are such that the production of a number of products is unavoidable. Even in such cases, however, it is highly desirable to allocate costs. It may be that in some industries, such as railroads, the problem is not capable of solution; this question will be considered later.

Although a firm may be producing but one product, cost statistics are necessary in order that the manager may have the information with which to make comparisons as to the efficiency of like productive units. If the enterprise consists of a number of plants performing similar functions, the general manager wishes to ascertain the relative efficiency of the various plants. Obviously this cannot be determined by inspection; statistical information is necessary. Not only are comparisons between plants necessary, but efficient management requires a knowledge of the comparative performances of departments, production centers, and even individual machines. Furthermore, the manager desires, if possible, a record of the individual performance of each employe, for only through such information is efficiency in labor possible.

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In connection with the utilization of the economic resources at the disposal of the manager, still other problems of importance arise. What are the proper combinations of the productive factors? Or, in other words, what is the most efficient process in view of all the market conditions? Many products can be produced by a number of processes; the manager must choose between them. For example, certain castings can be sawed witih hand tools at a simple work bench, or they can be cut by an automatic milling machine. Which process should be adopted? One method employs little capital and a large amount of current labor; the other process makes use of a high-priced machine and little direct labor. The cost per unit of output by both methods must be ascertained. If labor is relatively high in price, the second method may give a lower cost per unit; if the capital costs (depreciation and interest) are high, the first process may be the more profitable.

The determination of the best method of remunerating labor is another problem of management. Statistical information concerning individual performances under different wage plans furnishes a basis for judgment as to the method which gives the greatest stimulus to labor under particular conditons, and hence is the most profitable.

On the basis of cost statistics the manager is able to set up standards of operation. Such standards may be applicable to an entire industry or only to the particular problems of an individual manager.

The Classification and Distribution of Expense

The total expense of operation may be classified into *direct* and *indirect* expenses. All materials and services consumed which can be readily charged to a specific unit of product, constitute the direct expense of producing that product. All materials and services consumed which cannot be allocated to particular units, except on some arbitrary basis, represent the indirect expense. Relatively few items can be placed wholly in either class. Labor, for example, in nearly all cases must be classified into direct and indirect labor; the same is true of raw materials and many other supplies and services.

A further classification of expense conforms to the nature of the enterprise and the various stages of the productive process. Thus we have *manufacturing* expense and *selling* expense.

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The following represents a possible classification of expense for a manufacturing enterprise:

Manufacturing:
- Direct—
  - Labor,
  - Materials,
  - Repairs, etc.
- Indirect—
  - Labor,
  - Materials,
  - Depreciation,
  - Interest, etc.

Selling:
- Direct—
  - Labor,
  - Materials, etc.
- Indirect—
  - Labor,
  - Materials,
  - Depreciation,
  - Interest, etc.

This is simply a general classification. The number of accounts and subsidiary records used in any case will depend upon the conditions obtaining in particular establishments.

The line of demarcation betwen direct and indirect expense is not obvious. Miscellaneous supplies and services are usualiy considered as an indirect expense, although as a matter of fact many such items enter directly into specific units of product and could be allocated to such product if the amount of clerical work involved did not render this inexpedient. A laborer is often transferred from one task to another during the day, and the problem of apportioning his wages between the two classes is a difficult one.

Assuming that it is possible to distinguish between direct and indirect expense, the problem of allocating indirect expense to specific units of output arises. The amount of indirect expense may be spread over the entire output on some arbitrary basis; or it may be apportioned between phases of the business (e. g. administrative expenses might be apportioned between the manufacturing and

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selling processes as was suggested in Chapter XI); or it may be allocated directly to some smaller unit, such as the *job*. Probably the latter procedure is the most scientific, but whatever division is adopted some arbitrary basis of distribution must be used. A method of allocation frequently employed is the distribution of indirect expense in proportion to the direct. For example, if the direct expense incurred in producing a particular unit of product is 2% of the total direct expense for the period; then, according to this method, 2% of the total indirect expense of the same period would be charged to this product. Similar methods are the distribution of overhead on the basis of a single direct cost, e. g. labor or materials. Such methods are in most cases unsatisfactory. Usually there is no relationship between the percentages of direct expense involved in the production of a particular unit. Frequently a large percentage of direct expense goes with a small overhead charge. For example, the skilled workman receiving $5 per day maybe working at a task which requires for equipment only a work bench and hand tools; while another task requires an expensive automatic machine and the attention of an unskilled workman drawing $2 per day. As far as solving the problems of the manager is concerned, distribution of indirect expense on any such basis is useless.

A large number of methods have been suggested for distributing indirect expense. A description of these is beyond the scope of the present discussion; and, moreover, no set rules are feasible for all cases. The conditions in any particular case must be thoroughly investigated and the various items constituting indirect expense must be allocated on the most scientific basis possible.

It is evident that the accuracy of cost statistics depends to a large extent upon the ease with which total expense can be divided into direct and indirect charges, and upon the proportion which these indirect charges bear to the total. Cost statistics undoubtedly are best adapted to manufacturing enterprises. In public utilities, where overhead or indirect expense forms about 65% per cent of the total outlay on the average, the efficacy of cost accounting is not certain. A railroad, for example, uses roadbed, track, and terminals—a very large portion of its equipment—for the production of a variety of services. Hence a large portion of total expense is indirect, consisting of maintenance, depreciation, interest, etc. The determination of the cost of a specific service under such conditions requires the use of arbitraries for such a large portion of the total charge as to make the result questionable. Nevertheless much interest is developing in cost acounting for railroads, and it may be that a reasona-

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bly accurate system of costs is possible even for such enterprises. Up to the present time, however, the best results have been attained in other lines of industry.

The work of the cost accountant consists largely in the construction of a system of statistical records which conforms to the nature of the particular enterprise and is adapted to disclose the facts necessary for the efficient management of that enterprise. Although the cost records must intermesh with the accounts proper, it is evident that cost accounting is quite distinct from financial accounting and represents the statistical side of scientific management and efficiency engineering, so-called.

Public Utility Accounting

The present controversy concerning the relative merits of public and private ownership in the field of quasi-monopolistic industry, and the decided tendency toward the extension of governmental control in this direction, have given rise to accounting problems sufficiently distinctive to form a special field of accounting of considerable importance.

The Hepburn Act of 1906, which gave to the Interstate Commerce Comission the right to prescribe uniform accounting methods for transportation agencies engaged in interstate traffic, is a recognition of the fact that public regulation of industry may be made more effective through the regulation of accounts. Furthermore, it is a recognition of the fact that intelligent and just regulation is possible only on the basis of the information furnished by an extensive analysis of the accounts. Under the authority of this act the Commission has constructed uniform systems of accounts for the public utilities under its jurisdiction. An example of one of these systems is that prescribed for steam railways. This system is classified into six groups of accounts: (1) investment in road and equipment; (2) operating expenses; (3) operating revenues; (4) income; (5) profit and loss; (6) balance sheet. A brief examination of the classifications of this system will serve to suggest some of the characteristics of public utility accounting.

The classification, Investment in Road and Equipment, includes the accounts which represent the cost of the fixed assets used in operation. This classification provides for three "general" accounts, and seventy-seven "primary" accounts. The general accounts are: Road; Equipment; and General Expenditures. Examples of primary acounts under Road are: Engineering: Land for Transportation Purposes; Ties; Rails; Station and Office Buildings; Roadway

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Buildings; Shops and Enginehouses; and Telegraph and Telephone Lines. Equipment contains the following subsidiary accounts: Steam Locomotives; Other Locomotives; Freight-train Cars; Passenger-train Cars; Floating Equipment; Work Equipment; and Miscellaneous Equipment. Those under General Expenditures are: Organization Expenses; General Officers and Clerks; Law; Stationery and Printing; Taxes; Interest during Construction; and Other Expenditures—General. The railroads are not restricted to the use of the primary acounts prescribed by the Comission; a greater or less number may be used according to the particular circumstances. No option is allowed, however, as to the character of the items entering these accounts.

Previous to 1907 (when the prescribed classifications went into effect) it had been the practice of many railroad companies to enter in the property accounts an amount equal to the par value of the securities issued, to avoid showing discounts on securities on the balance sheet. Furthermore, the accounting treatment of the property items after construction varies with the success of the enterprise. Thus roads making large earnings charged improvements to expense; other roads with small earnings continued to inflate property values by charging replacements to capital. Consequently the value of the property as shown by the accounts seldom approximates actual values as far as construction prior to 1907 is concerned. An important problem of railroad accounting is the determination of the value of the property used. This problem is of more significance in public utilities than in competitive industry because of the accepted theory that rates should yield a fair return on the investment. The purpose of the present Federal valuation project is, in part at least, an attempt to correct the figure, Investment in Road Equipment, as it now stands.

Ostensibly the purpose of the entries in the accounts of this classification is to maintain the balances of these accounts at the actual value of the property. Yet the rules of the I. C. C. in connection with the replacements of certain types of property prevent the attainment of this object. When an item of abandoned property such as ties is replaced the rules prescribe, for example, that "the excess cost of metal ties applied in place of wooden ties over the cost at current prices of replacing in kind the wooden ties removed shall be charged to road equipment account, No. 8 Ties." In other words, the amount appearing in the Ties account will be less than the present value of the ties in use. If the property is replaced in kind, but at a higher price, the property account would represent the cost

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of the original item rather than that now in use. In case the property is replaced in kind but at a lower price the property account would represent an overstated property value. Such rulings in a period of rising prices would work to the disadvantage of the investor; in a period of falling prices such regulations are detrimental to the interests of the public. In either case the accounts fail to represent the actual value of the property. It is especially important in public utility enterprises that the accounts should be as sensitive as possible to changes in the price level, for only in this way can changing capital costs be recognized, and the rates adjusted to meet the new situation.

The Operating Expense classification has the following general accounts: Maintenance of Way and Structures; Maintenance of Equipment; Traffic; Transportation—Rail Line; Transportation—Water Line; Miscellaneous Operations; General; Transportation for Investment—Credit. These accounts are subdivided into 210 primary accounts. It is evident from the titles of the general accounts that this classification is constructed primarily to meet the needs of the operating managed. The emphasis of the classification is placed upon the cost of rendering the service of transportation.

In this classification the line between expense and capital charges is very carefully drawn, but as is evident from the above discussion in regard to the accounting treatment of replacements, the rules of the Commission do not apportion charges between expense and capital in strict harmony with accounting theory. Thus when rails are replaced with more valuable types, operating expense is charged with the cost of replacing the old rails in kind, rather than with the value of the abandoned units as represented in the property account.

In the matter of depreciation charges considerable leeway is allowed the railroad companies. No set rule for measuring depreciation is prescribed. The carrier itself is allowed to estimate the anual depreciation charge, but is required to charge one-twelfth of this amount to the operating expense of each month. In case the amount of abandoned property is in excess of the reserve for depreciation for that type of property, the Commision allows the company to carry the item on the balance sheet as a deferred asset and distribute it in the operating expenses of succeeding periods.

Operating Revenues is divided into four general revenue accounts, as follows: Transportation—Rail Line; Transportation—Water Line; Incidental; Joint Facility. The primary accounts are thirty-nine in number. This classification is not as elaborately developed as Operating Expenses. It might be expanded considerably

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and better serve the needs of the traffic manager. Throughout this classification the accrual basis is emphasized. This is noteworthy in view of the fact that a large proportion of railway revenues are on a cash basis.

An illustration of the nature of the Income, and Profit and Loss classifications is given in the annual statement of the Pennsylvania Railroad Company, shown in Chapter XI. The Profit and Loss classification in practice is used for adjustments in proprietorship and for making appropriations from surplus. The railroads are allowed "to charge to Profit and Loss account No. 617, Debit Discount Extinguished Through Surplus, all, or any portion of the discount and expense on funded debt remaining at any time unextinguished." This procedure is inconsistent with the theory that the income statement should exactly represent the fiscal period. If discount on funded debt is not amortized through the annual interest charges, net income will not be correctly stated.

The following represents the form of the balance sheet and the accounts of which this classification is composed:

ASSET SIDE[1]

Investments:
- Investment in road and equipment.
- Improvements on leased railway property.
- Sinking funds.
  - Total book assets at date. (In short column.)
  - Carriers' own issues at date. (In short column.)
  - Other assets at date. (In long column.)
- Deposits in lieu of mortgaged property sold.
  - Total book assets at date. (In short column.)
  - Carrier's own issues at date. (In short column.)
  - Other assets at date. (In long column.)
- Miscellaneous Physical Property.
- Investments in affiliated companies—
  - (a) Stocks.
  - (b) Bonds.
  - (c) Notes.
  - (d) Advances.

[1] From the published classifications of the Interstate Commerce Commission.

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Other investments—
(a) Stocks.
(b) Bonds.
(c) Notes.
(d) Advances.
(e) Miscellaneous.
Total.

Current Assets:
Cash.
Demand loans and deposits.
Time drafts and deposits.
Special deposits.
Total book assets at date. (In short column.)
Carrier's own issues at date. (In short column.)
Other assets at date. (In long column.)
Loans and bills receivable.
Traffic and car-service balances receivable.
Net balance receivable from agents and conductors.
Miscellaneous accounts receivable.
Material and supplies.
Interest and dividends receivable.
Rents receivable.
Other current assets.
Total.

Deferred Assets:
Working fund advances.
Insurance and other funds.
Total book assets at date. (In short column.)
Carrier's own issues at late. (In short column.)
Other assets at date. (In long column.)
Other deferred assets.
Total.

Unadjusted Debits:
Rents and insurance premiums paid in advance.
Discount on capital stock.
Discount on funded debt.
Property abandoned chargeable to operating expenses.
Other unadjusted debits.
Securites issued or assumed—Unpledged. (In short column only.)
Securities issued or assumed—Pledged. (In short column only.)
Total.

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LIABILITY SIDE

Stock:
- Capital stock—
  - Book liability at date. (In short column.)
  - Held by or for carrier at date. (In short column.)
  - Actually outstanding at date. (In long column.)
- Stock liability for conversion.
- Premium on capital stock.
  - Total.

Governmental Grants:
- Grants in aid of construction.

Long Term Debt:
- Funded debt unmatured—
  - Book liability at date. (In short column.)
  - Held by or for carrier at date. (In short column.)
  - Actually outstanding at late. (In long column.)
- Receiver's certificates.
- Non-negotiable debt to affiliated companies—
  - (a) Notes.
  - (b) Open accounts.
    - Total.

Current Liabiliities:
- Loans and bills payable.
- Traffic and car-service balances payable.
- Audited accounts and wages payable.
- Miscellaneous accounts payable.
- Interest matured unpaid.
- Dividends matured unpaid.
- Funded debt matured unpaid.
- Unmatured dividends declared.
- Unmatured interest accrued.
- Unmatured rents accrued.
- Other current liabilities.
  - Total.

Deferred Liabilities:
- Liability for provident funds.
- Other deferred liabilities.
  - Total.

Unadjusted Credits:
- Tax liability.
- Premium on funded debt.
- Insurance and casualty reserves.

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Operating reserves.
Accrued depreciation—Equipment.
Accrued depreciation—Road.
Accrued depreciation—Miscellaneous physical property.
Other unadjusted credits.
Total.

Corporate Surplus:
Additions to property through income and surplus
Funded debt retired through income and surplus.
Sinking fund reserves.
Miscellaneous fund reserves.
Appropriated surplus not specifically invested.
Total appropriated surplus.
Profit and loss—Balance.
Total corporate surplus.

This balance sheet has been a model for the construction of classified financial statements in many types of industry. The discussion of the balance sheet in the preceding chapter follows this general form.

One peculiarity of this classification is worthy of mention. An equity of the public is here recognized by a distinct account; viz., Grants in Aid of Construction. This emphasizes the importance of the equity of the public in public utility enterprises.

Municipal Accounting[2]

That very few cities present financial statements that are adequate for the purposes of basing a judgment as to the efficiency of city administration, is a well-known fact. The accounting systems for cities are generally of the primitive cash book class. That is, all transactions are recorded only as cash is received or paid by the city, and the only statements which are prepared at the end of the year are those which show the amount of cash received and disbursed during the year. Many safeguards have been placed on the officials who receive and disburse the cash with the very effective result that cash is rarely, if ever, diverted from the city funds other than on properly authorized warrants from the city council or commission; but no accounts are kept nor schedules prepared to reflect the efficiency of the administration and thus insure that all expenditures are incurred for the best interests of the city.

[2] Adapted from an article published in the Efficiency Society Journal for August, 1916.

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The legislatures of some states have enacted statues regulating the amounts which may be levied on property for certain purposes and providing that funds may be used for no other purposes than those for which they were obtained. These laws are but a step in the direction of requiring a financial program of each city administration which will be reflected in the accounting statements.

It is with the idea of presenting the general principles of accounting which should be used in preparing statements for the use of city councils and citizens in judging of the proper administration of city finances that the Balance Sheet, the Income Statement, and the Budget are here discussed in their relation to municipal accounting.

The Municipal Balance Sheet

The council is entrusted with the administration of certain properties, and unless a proper statement of the condition of these properties be given at the beginning and end of each year, the council cannot be held to a strict accountability for its administration. The statement which should be used for this purpose is the balance sheet. The assets in this case would consist in all properties owned by the city; actual improvements to public street and parks; all uncollected taxes and assessments; and the actual cash balances in the various funds. The liabilities would consist in the bonds outstanding and the current liabilities incurred but not yet paid. The difference between the assets and the liabilities is the surplus or net investment of the citizens. This surplus represents the amount of permanent assets which the citizens have already paid for.

Balance sheets prepared each year may be used for comparative purposes and will give a clear idea of the policy of the city. They will show whether a city is paying for its improvements as it goes, or is piling up a debt against posterity. As long as the value of the assets exceeds the liabilities, the city is paying as it goes; but when the liabilities exceed the assets, a debt is being laid up against the future.

It would be a relatively simple matter for most cities to prepare a balance sheet each year, although the first one would present some difficulties. An appraisal should be made of all land owned by the city by a person competent to judge of land values. This figure would constitute the land value on the first balance sheet. As new land is acquired, all costs of acquiring title should be added to this land asset account, and as any land is disposed of by the city, the value as appearing in the balance sheet should be deducted. This

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would always leave the land account on the balance sheet at a figure representing the value of the land owned.

The buildings and structures should be appraised on the basis of cost minus depreciation. The value of the buildings in the balance sheet should always be the value at the date the balance sheet is prepared. This will insure that a proper portion of the cost of the buildings will be charged as expense each year. Furthermore, this will have a good effect on the method of financiering. Suppose that a municipal building has been erected at a cost of $80,000 and it is shown by the Building account to be worth $40,000 at the end of the tenth year; and that $80,000 of the bonds are still outstanding with no sinking fund to retire them. It will readily be seen that some source of revenue must be found to meet the $80,000 due in ten years. If the bonds were to run to maturity without a sinking fund to retire them, and if the building were to be destroyed at that time, the future citizens would be compelled to pay for a building which was completely consumed by the preceding generation.

The public improvements and the equipment should be valued by authorities on these subjects. The value of a paved street is the total cost of having the paving laid, including the incidental expense of inspection, relaying crosswalks, and regarding park extensions. This value decreases as the time for replacing approaches. The cost of equipment is the contract price plus expenses incident to getting it ready for actual use. Its value also decreases as it nears the time for replacement.

The current assets, consisting of supplies or tools, and stores, should be valued at their cost delivered in the storehouse, but only those items actually in the storehouse should be included in the account on the balance sheet.

All assets having been valued, the liabilities outstanding against these assets must be shown. One of the principles of public finance requires that every generation bear its own operating expenses; only actual improvements which will confer benefits in the future should be charged against posterity. The method of charging future generations with their share of public improvements is by issuing long term bonds. Inasmuch as a fair valuation has been placed on all the assets, including public improvements, the placing of the liabilities against these assets will determine whether or not the city is meeting its obligations as they fall due, or whether an increasing burden is being left to be settled in the future. The issuing of bonds to cover an operatng deficit is a method of financing which should not be tolerated by fair-minded citizens.

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The amount of bonds outstanding and the current liabilities added together give the total liabilities, which, deducted from the assets, gives the surplus—this amount being centered on the liability side of the balance sheet.

To summarize the advantages of a municipal balance sheet:

(1) It provides a clear statement of property owned by the city.

(2) It gives a detailed statement of the liabilities.

(3) It shows how much of the public property has been paid for.

(4) It reflects the financial policy of the city.

(5) It provides a check on unwise and unfair issuing of bonds in order to lower the present tax rate.

The Income Statement

The only legitimate reason for issuing bonds to raise funds is to cover the cost of lasting public improvements. This means that all current expenses of the city must be met out of current revenue. It is the duty of the city council to see that this is done, but it is impossible to do so without a statement of actual expenses. The expenses being shown, the revenue may be raised by levying the proper assessments to cover them.

At the beginning of each fiscal year, a budget is prepared which gives the estimated expenses of the ensuing year, and the revenue necessary to cover them. On the basis of this budget, taxes are levied. The estimates of expenses are based on the statement of expenses for the previous year. This shows how important it is that the expense statement be accurately prepared.

The statement from which the budget is prepared in most cities is that of receipts and disbursements.[3] This is a statement of cash received and paid out of the various funds during the year. That this is inadequate for budget making is obvious when one stops to consider that cash disbursements and expenses are not synonymous. Payments are often made for permanent improvements which are not expenses. Disbursements are also made in one year to cover expenses of a previous year. Likewise expenses of the present year often do not apear among the disbursements, but will be found in later years. It is necessary to prepare a statement which will reflect the actual expenses of the year. This is possible only through an Income Statement. Such a statement gives the expenses for a period, regardless of whether a cash payment is made or not, and

[3] See Chapter VI.

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the revenue accrued during the same period regardless of the amount of cash received.

The efficiency of the administration may be determined by comparing the expense of performing the various services one year with another, allowance being made for differences in the amount of service given. With a statement of this sort to be prepared each year, the various department heads will attempt to show a lower expense for the same quantity of service or greater servi ce for the same expense. This would put the city on a more efficient working basis.

The Expense Classification

The income statement is not adequate for the needs of the administrator who needs sufficient information to direct the actual operation of his organization. For the purposes of direct administrative control it is necessary to classify the expenses of each function so that it is possible to set up standards of operation. After such standards have been established, it is possible to locate inefficiency and to make the necessary remedies. A further purpose of such a classification is to obtain unit costs of services which may be used in estimating the expense of instituting new methods of administration. This may be accomplished by classifyiing the expenses of each department into accounts, each of which will represent the cost of a service and an authority for the expenditure.

The following is suggested as a possible classification of expense accounts for small cities. The words in italics are titles of accounts in which the items mentioned should be included:

1. Police Department.

(a) *Administration.* The cost of administering the depart ment, such as the salary of the chief, and the maintaining of the office.

(b) *Patrol Expenses.* The cost of maintaining the regular police patrol for the general protection of life and property, such as patrolmen's salaries.

(c) *Traffic Regulation.* Traffic policemen's salaries, special traffic officers, marking danger zones, etc.

(d) *Enforcing Municipal Ordinances.* Ordinances are frequently passed by the city councils which cost more to enforce than would be justified by the benefits derived. In order that an increase in police expenses will not be considered as due to iniefficiency, the cost of enforcing these ordinances should be entered in separate accounts under this head. This account would be divided into as many

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such accounts as there were ordinances which required special enforcement by the police department.

(e) *Maintaining Buildings and Equipment.* The cost of repairing and maintaining the various buildings and equipment used by the department.

(f) *General Operating Expenses.* The expenses which can not be included in any of the above items and which are not important enough to warrant the use of special accounts.

2. Fire Department.

(a) *Administration.* The costs of administering the department, consisting of the chief's salary and the general office expenses, should be included in this account.

(b) *Fire Prevention.* The expenses connected with inspecting building and regulating building operations for this purpose should be entered in this account.

(c) *Fire Fighting Expense.* The firemen's salaries, the maintenance of the alarm system and the fire fighting equipment, as well as supplies used in this connection.

(d) *Maintaining Buildings.* The expense of maintaining the fire department stations.

(e) *General Operating Expenses.* Those operating expenses which are either common to more than one of the above services or which are not of sufficient importance to warrant creating new accounts.

3. Health Department.

(a) *Administration.* The expenses of administering the department, such as the health officer's salary, the health physician's salary, and the office expenses.

(b) *Statistical Expenses.* The cost of investigating civic health conditions, the keeping of statistical records and vital statistics, and the preparing of reports on health.

(c) *Inspection.* The cost of inspecting milk and other foods as required by city health ordinances. The maintainance of municipal laboratories for this purpose should also be included.

(d) *Hospital Service.* The expenses of the department where hospital service is granted for health department purposes. Where the city owns and operates a hospital, however, a special classification of accounts should be kept. The details of such a classification would depend on the method of administering the hospital and on the service given.

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(e) *Sewage Disposal.* There are sometimes several different methods of disposing of sewage in one city. Where this is the case, a separate account should be kept for the expenses of each method. These accounts may then be used for comparing the cost of using one method with that of another for the purpose of determining the future policy of the city in this regard.

(f) *General Operating Expenses.* The expenses of the department which may not be directly apportioned to the cost of any one service, or which are not sufficiently important to warrant opening special accounts.

The Commercial Services

Whenever a city undertakes the operation of a public utility, such as the water works, electric light plant, or street railway, it should do so for the purpose of supplying certain commercial services to the citizens at the cost of producing them. The revenue to cover the operating expenses is obtained by charging a price for the service. The accounts for the commercial functions must, therefore, be adequate for price making purposes; this being the most important use to which they are put. It is just as important that the prices fixed be not higher than sufficient to cover expenses as it is that they be high enough to do so, the main purpose of municipal ownership being to effect savings to the patrons. In order that this may be accomplished, each utility owned by the city should be treated as a company distinct from the other city activities, thus insuring that the burden of expense will be borne by the proper parties.

The following is suggested as a classification of both revenue and expense for the ordinary commercial services of a city:

1. Water Department.
   Revenue:
      Private service.
         (a) Metered
         (b) Unmetered
      Municipal service
         (a) Fire protection
         (b) Parks
         (c) Public buildings, etc.
      Miscellaneous revenue
         (a) Special work
         (b) Meter rentals
         (c) Sundry accounts

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Expenses:
- General
  - (a) Administration
  - (b) Insurance, etc.
- Operating
  - (a) Operating management
  - (b) Collection system
  - (c) Distribution system.
- Maintenance
  - (a) Collection system repairs
  - (b) Distribution system repairs
  - (c) Depreciation on plant

2. Electric Department Income Accounts

Revenue:
- Comercial lighting
- Commercial power
- Street lighting
- Municipal power service
- Miscellaneous revenue

Expenses:
- Production expenses
- Transmission expenses
- Distribution expenses
- Comercial expenses
- General expenses

The Municipal Budget.

The only power of control over city finances which is retained by the citizens is their right to approve or disapprove, at the municipal elections, of the council's method of administration. In order that this right may be exercised in an intelligent manner, a financial program should be approved by the citizens at the beginning of each fiscal year. The statement to be supplied by the city officials for this purpose should contain a report of the financial results of the previous year's activities, and the plans of the administration for the ensuing year, together with the costs and the contemplated means of raising the necessary funds. The ordinary practice of city councils is to publish a statement of receipts and disbursements, together with an estimate of the cash to be raised during the following year through taxes. Although the name *budget* is

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